Key Planning Factors and Considerations for Response to and Recovery from a Biological Incident

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Record of Change

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This is to notify users that as of 07/12/2023 the FEMA Chemical, Biological, Radiological and Nuclear (CBRN) Office, the developer of this guidance document, has been reorganized to the Office of Emerging Threats (OET).

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Introduction

Overview

Because biological incidents can cross jurisdictional boundaries and have cascading effects, coordinated response and recovery efforts will include organizations at all levels of government, the private sector, non-governmental organizations (NGOs), and, potentially, international partners. Planning for a biological incident requires considerations beyond a general, all-hazards approach to preparedness; this document focuses on strategic issues and critical considerations that are specific to infectious diseases and biological incidents.

Purpose

The purpose of this document is to identify key areas where appropriate planning among key partners and stakeholders can significantly enhance the response to and recovery from a biological incident. It serves as a comprehensive update of the April 2017 *Key Planning Factors and Considerations for Response to a Biological Incident* and now includes planning considerations for recovery, issues related to household pets and service animals, non-pharmaceutical interventions (NPIs), medical countermeasures (MCMs), and public fear during a biological incident.

Although they may vary based on the size, scope, and complexity of a particular incident, the overall challenges posed by a biological incident and corresponding menu of response and recovery measures to be considered will be similar regardless of agent or disease vector. These include consideration of the pathogen causing disease, potential intentionality of the incident, availability of specialized MCMs, long-term contamination, etc. For this reason, the document does not describe planning approaches to specific biological incident scenarios (e.g., template plans for various individual pathogens). Rather, it provides key planning factors (KPFs) and considerations applicable across a range of potential biological incident types.

Scope

The scope of this document is planning for biological incidents in state, local, tribal, and territorial (SLTT) jurisdictions throughout the United States (U.S.). While most international issues are beyond the scope of this document and are addressed principally at the federal level, some considerations are included here as they may relate to SLTT biological incident response and recovery. Readers are directed to the *Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (BIA; FIOP) for additional information on the United States government's (USG's) international engagement during a biological incident.

Foodborne and agricultural incidents are also beyond the scope of this document, and readers are directed to the *National Food and Agriculture Incident Annex to the Response and Recovery Federal Interagency Operations Plans* (FAIA; FIOP) for additional information.

Audience

This document supports education, awareness, and guidance for the development of effective biological incident plans at the SLTT and regional levels. The intended audience is SLTT emergency management planners.

Organization of Document

This document is organized into seven sections:

- **Crosscutting Considerations**: Provides background on biological incidents, past examples, common characteristics across all types of pathogens, planning considerations, and relevant authorities and legislation.
- **KPF 1: Detect and Characterize the Threat-** Offers an overview of biological incident detection, incident characterization, initial response, and considerations for criminal investigations.
- **KPF 2: Communicate with External Partners and the Public-** Identifies effective communication strategies to provide public information and to collaborate with partners for a coordinated response and recovery effort.
- **KPF 3: Control the Spread of Disease**- Describes types of NPIs, access to MCMs, environmental containment, source reduction, and decontamination during biological incidents.
- **KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population-** Explains mass care considerations for shelter-in-place or restricted movement scenarios and for evacuation scenarios. Additional information on mental health, public fear, and household pets and service animals is also included.
- **KPF 5: Augment Provision of Health and Medical Services to the Affected Population**- Details medical care considerations, healthcare resilience, and fatality management.
- **KPF 6: Augment Essential Services to Achieve Recovery Outcomes**- Reviews recovery planning, indicators, and priorities for a biological incident including considerations for long-term recovery. Supporting the affected community through Recovery Support Functions (RSFs) is also discussed.

These KPFs are augmented by Planning, Decision-Support, and Modeling Resources for Biological Incidents and various appendices, which provide additional reference materials that will be useful when developing plans and implementing the actions recommended throughout the document.

While You Read

Throughout this document, the reader will find specialized callout boxes that highlight opportunities for action and coordination with other government agencies or jurisdictions and community partners or reference external materials. A guide to those specialized callout boxes is provided here.

Action Item

A suggested activity to complete during planning

Coordination Opportunity

An example of stakeholder coordination highlighted in the content

Refer To

Guidance for locating more information from a separate resource

What Would You Do?

A critical thinking exercise or discussion question

What Will You Need To Know?

Questions to answer or consider when creating or reviewing plans

Crosscutting Considerations

Biological incidents are often complex. Such incidents pose many unique challenges that impact traditional approaches to key response and recovery goals such as the preservation of life, property, and the environment; promotion of economic stability; and meeting basic human needs. Compared with other all-hazards incident types, planning and preparedness for biological incidents requires consideration of a variety of factors unique to scenarios involving infectious disease outbreaks. This section provides foundational information that is critical for understanding commonalities shared by the various types of biological incidents and their influence on response and recovery.

What Is a Biological Incident?

For the purpose of this document, a biological incident refers to the occurrence of individual cases or outbreaks involving an infectious pathogen that affects people, regardless of whether it is naturally occurring or deliberately caused. Biological incidents, often leading to declarations of public health emergencies, can occur anywhere within the U.S., sometimes impacting multiple geographic regions simultaneously. Greater movement of people, animals, and goods across local, state, territorial, and international borders increases the risk of exposure to health threats originating both inside and outside of the U.S. Widespread and improper use of antimicrobial (such as antibiotic) treatments and other MCMs are also accelerating the emergence of drug-resistant pathogens.

Planning and preparedness for biological incidents requires consideration of the characteristics that are unique to these events, such as the potential contagious nature of a disease, need for and availability of specialized MCMs and resources to address long-term contamination, or the possibility for an incident to be the result of an intentional attack.

- Infectious diseases are illnesses caused by germs (such as bacteria, viruses, or fungi) that enter the body, multiply, and can cause an infection.[1] Infectious diseases may also be referred to as communicable or transmissible diseases.
- Infectious diseases may be transmitted by contact with infected individuals or bodily fluids (such as respiratory droplets, blood, or semen), by contact with contaminated surfaces or objects (fomites), by ingestion of contaminated water, or by direct or indirect contact with disease vectors (such as mosquitoes, fleas, or mice).

[1] Centers for Disease Control and Prevention (CDC). (2017, August 28). *Who We Are*. National Center for Emerging and Zoonotic Infectious Diseases (NCEZID). https://www.cdc.gov/ncezid/who-we-are/index.html

- A contagious disease is an infectious disease that is spread from one person to another.[2] Only some infectious diseases are contagious.

During a biological incident, the roles and responsibilities of public health, healthcare, emergency management, and potentially law enforcement officials should be expected to intersect. Hence, success in achieving response and recovery objectives will require the ongoing engagement of a wide variety of partners. Similar to other types of emergencies, most biological incidents are managed locally or regionally by existing response and recovery structures using established coordination processes. Federal support may be available during instances in which SLTT needs exceed the capacity of available resources.

Disaster Declarations for Past Biological Incidents in the United States

Historically, biological incidents, such as past outbreaks of severe acute respiratory syndrome (SARS; 2003), H1N1 influenza (2009), Zika virus disease (2016–2017), and the 1993 Milwaukee *Cryptosporidium* outbreak have not resulted in an emergency or major disaster declaration under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act). In contrast, the national-level response needs for the coronavirus disease 2019 (COVID-19) pandemic prompted the President to make an emergency declaration under the Stafford Act to support large-scale biological incident response and recovery activities. To date, the only other instance of a President issuing an emergency declaration under the Stafford Act in response to an infectious disease event occurred in 2000 during the West Nile virus (WNV) outbreak response in New York and New Jersey.[3] Readers are directed to the BIA for more information on federal emergency or disaster declarations made during past biological incidents. Further discussion of public health emergency declarations can be found in the Relevant Authorities and Legislation section below.

Illustrating Examples of Past Incidents

The challenges posed by a biological incident and corresponding response and recovery strategies will largely depend on the pathogen involved, its mode of transmission, the availability of MCMs, and the intentionality (e.g., accidental vs. malicious) of the release. A wide range of incident types are possible, from incidents that harm just one person in a single location, to a pandemic infecting millions globally. While this range greatly influences response and recovery considerations for planners, in all cases, key considerations should be based on the biological agent's potential to cause harm to humans, animals, or the environment. Described as examples below, past domestic and international incidents illustrate the wide range of potential scope, scale, and response needs for different types of biological incidents.

[2] CDC. (2017, August 28). *Who We Are*. NCEZID. https://www.cdc.gov/ncezid/who-we-are/index.html

[3] Congressional Research Service. (2021). *Stafford Act Assistance for Public Health Incidents*. https://crsreports.congress.gov/product/pdf/IN/IN11229

SVERDLOVSK ANTHRAX OUTBREAK (1979)[4]

In April 1979 in Sverdlovsk, Union of Soviet Socialist Republics (USSR), animals, including livestock, began dying from anthrax, with no identified environmental source. Shortly thereafter, doctors began to report illnesses and deaths in humans from anthrax. The origin of the anthrax in humans was initially reported to be contaminated meat; later, scientists observed that most of the humans and animals affected lived within a narrow zone downwind of a nearby military facility and determined that this military facility had accidentally released anthrax spores into the air.

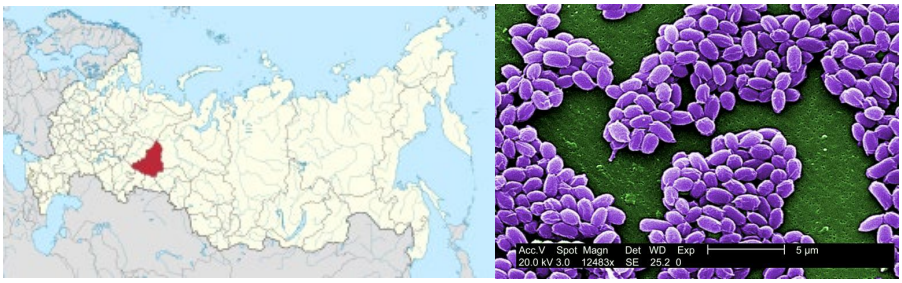

Figure 1: *Bacillus anthracis* spores released from a military facility in Sverdlovsk, Union of Soviet Socialist Republics (USSR) [5]

This incident represents the largest documented outbreak of human inhalation anthrax, with 96 cases leading to 64 deaths, and demonstrates how a biological release may not be recognized for some time, during which the extent of the hazard and the source/cause of the incident will remain unclear. Further, the incident demonstrates how biological agents may move (especially via water or air) and persist in the environment and how they can affect the health of both human and animal populations within a community.

AMERITHRAX (2001)[6]

The Amerithrax incident of 2001 represents the malicious use of a biological agent and the potential for intentional biological incidents to cause outsized harm to society and to engender fear among U.S. citizens. On October 3, 2001, an employee of Florida American Media, Inc. was diagnosed with

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[4] Meselson, M., Guillemin, J., Hugh-Jones, M., Langmuir, A., Popova, I., Shelokov, A., Yampolskaya, O. (1994). The Sverdlovsk anthrax outbreak of 1979. *Science, 266*(5188), 1202–1208. https://www.science.org/doi/10.1126/science.7973702

[5] (Left) Stasyan117. (2015). *Русский: Свердловская область на карте России* [Online image]. https://commons.wikimedia.org/wiki/File:Map_of_Russia_-_Sverdlovsk_Oblast.svg; (right) Carr, J.H. (2002). *Sterne strain of Bacillus anthracis bacteria* [Photograph]. CDC. https://phil.cdc.gov/Details.aspx?pid=10122

[6] Department of Justice (DOJ). (2010). *Amerithrax Investigative Summary*. https://www.justice.gov/archive/amerithrax/docs/amx-investigative-summary.pdf; CDC. (2020, November 20). *Ciprofloxacin for Post-Exposure Prophylaxis of Anthrax.* NCEZID. https://www.cdc.gov/anthrax/medical-care/cipro-eui-hcp.html#:~:text=The%20full%20PEP%20regimen%20is,additional%20quantities%20of%20the%20drug

inhalational anthrax; he died two days later. Soon after, anthrax spores were found in the office where the employee worked. This man's death, along with multiple suspicious letters found within the postal system around the same time (one of which potentially reached the man's office), triggered a U.S. Department of Justice (DOJ) Federal Bureau of Investigation (FBI) investigation. Additional contaminated letters were sent to the New York Post and NBC News in New York City, where they sickened multiple media organization employees and U.S. Postal Service (USPS) workers.

Three weeks later, letters laced with anthrax spore-containing "white powder" were sent to U.S. senators Daschle and Leahy at their Washington, D.C., offices. The letter to Senator Daschle was opened in Hart Senate Office Building on October 15, 2001, triggering evacuations, mass prophylaxis of government employees, and subsequent building decontamination. The letter to Senator Leahy was not discovered initially and was not recovered until a month later.

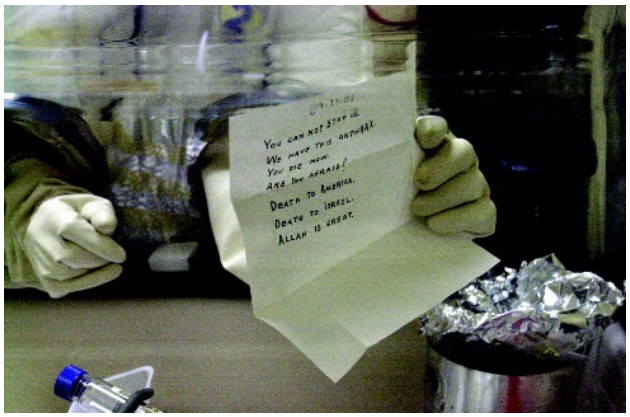

Figure 2: Laboratory technician holding the anthrax-laced letter addressed to Senator Leahy after safely opening it at the U.S. Army's Fort Detrick biomedical research laboratory in November 2001[7]

Contamination due to the circulation of these letters within the USPS system resulted in five deaths and sickened 22 others. The incident, one of the worst biological attacks in U.S. history, spurred the closing of 35 commercial mailrooms and postal facilities along with 26 buildings on Capitol Hill for investigation and decontamination. Due to the potential for widespread USPS worker exposure, more than 3,000 postal workers in New York, New Jersey, and Washington, D.C., were prescribed an emergency course of prophylactic antibiotics. While the discrete location of each incident allowed for a tailored response to this intentional attack, the accompanying fear affected many, and the expense of necessary site decontamination activities was great.

[7] Federal Bureau of Investigation. (n.d.). *Laboratory technician holding the anthrax-laced letter addressed to Senator Leahy* [Photograph]. https://www.fbi.gov/history/famous-cases/amerithrax-or-anthrax-investigation

EBOLA VIRUS DISEASE (2014)[8]

In August 2014, an Ebola virus disease (EVD) outbreak in West Africa was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO). At the time of the PHEIC declaration, this was the largest EVD outbreak ever recorded. The outbreak involved transmission in Guinea, Liberia, Nigeria, and Sierra Leone, with these four countries reporting 1,779 cases, including 961 deaths.[9]

On September 25, 2014, a man visiting Dallas, Texas, sought treatment at the Texas Presbyterian Hospital emergency department. He was initially diagnosed with sinusitis and unspecified abdominal pain and sent home with antibiotics. Three days later, the man's symptoms had worsened, and he was transported by ambulance back to the hospital. This time, the doctor noted the man had recently traveled from Liberia and ordered a test for Ebola virus infection. The doctor also contacted the U.S. Department of Health and Human Services (HHS) Centers for Disease Control and Prevention (CDC). On September 30, the HHS CDC announced the man was diagnosed with EVD, making it the first laboratory-confirmed Ebola case diagnosed in the U.S. The man's condition worsened despite the provision of critical care and experimental drug treatment, and he died on October 8. Local public health officials conducted contact tracing of the patient, and all 177 known contacts were monitored for 21 days.

Two healthcare workers who cared for the patient discussed above at Texas Presbyterian Hospital subsequently developed symptoms, and both tested positive for Ebola virus infection. Due to the potentially high mortality rate of EVD, these two healthcare workers were transferred to highly specialized treatment centers at the National Institutes of Health (NIH) Clinical Center in Bethesda, Maryland and Emory Hospital in Atlanta, Georgia, respectively, and both recovered. Also in October 2014, the New York City Department of Health and Mental Hygiene reported a case of EVD in a physician who had just returned from Guinea where he served with Doctors Without Borders. The physician was treated at Bellevue Hospital Center and discharged. Contact tracing and quarantine measures were implemented for people in contact with each of the three healthcare workers that developed EVD infections. In addition, the physician's apartment and the bowling alley he visited the day before his hospitalization required decontamination.

[8] Joint and Coalition Operational Analysis (JCOA). (2016). *Operation United Assistance: The DOD Response to Ebola in West Africa*. https://www.jcs.mil/Portals/36/Documents/Doctrine/ebola/OUA_report_jan2016.pdf; McCarthy, M. (2014). Liberian man being treated for Ebola in Texas dies. *BMJ: British Medical Journal 349*: g6145. https://doi.org/10.1136/bmj.g6145

[9] World Health Organization (WHO). (2014, August 8). *Ebola outbreak in West Africa declared a public health emergency of international concern*. https://www.euro.who.int/en/health-topics/communicable-diseases/pages/news/news/2014/08/ebola-outbreak-in-west-africa-declared-a-public-health-emergency-of-international-concern

Figure 3: Ebola patient being transferred by ambulance

The intense resource requirements necessary for treating, quarantining, contact tracing, decontaminating, and mass public messaging in incidents involving diseases with high mortality rates may quickly surpass most local response capabilities. In 2014, Ebola was handled by local authorities reporting to state and federal authorities, which enabled national coordination across states. This incident also highlights the possibility for public fear of a disease to take hold. While Ebola is a serious and deadly disease, according to the HHS CDC, a person can only spread Ebola to other people after developing signs and symptoms, with EVD posing little risk to travelers or the general public who have not cared for or been in close contact with someone sick with Ebola.[10] Risk communication is critical to effective biological incident response and recovery.

CORONAVIRUS DISEASE 2019 (2020)[11]

At the time of writing this document, the coronavirus disease 2019 (COVID-19) pandemic is ongoing and has caused the deaths of more than 6 million people worldwide.[12] The first COVID-19 cases in the U.S. were identified at the end of January 2020 and were associated with travel to China. The Secretary of HHS declared a public health emergency on January 31, 2020. Community transmission of COVID-19 was first documented in Seattle, Washington, when the first non-travel-related case of COVID-19 in the U.S. was confirmed on February 28, 2020. In response to the growing risk of widespread disease transmission throughout the U.S., the President declared a nationwide

[10] CDC. (2021, January 14). *Transmission*. NCEZID, Division of High-Consequence Pathogens and Pathology (DHCPP), Viral Special Pathogens Branch (VSPB). https://www.cdc.gov/vhf/ebola/transmission/index.html

[11] Jorden, M.A., Rudman, S.L., Villarino, E., Hoferka, S., Patel, M.T., Bemis, K., Simmons, C.R., Jespersen, M., Johnson, J.I., Mytty, E., Arends, K.D., Henderson, J.J., Mathes, R.W., Weng, C.X., Duchin, J., Lenahan, J., Close, N., Bedford, T., Boeckh, M., Chu, H.Y., Englund, J.A., Famulare, M., Nickerson, D.A., Rieder, M.J., Shendure, J., Starita, L.M. (2020). Evidence for Limited Early Spread of COVID-19 Within the United States, January–February 2020. *Morbidity and Mortality Weekly Report (MMWR), 69*(22), 680–684. http://dx.doi.org/10.15585/mmwr.mm6922e1; Department of Health and Human Services (HHS). (2021, September 13). COVID-19 Vaccine Distribution: The Process. https://www.hhs.gov/coronavirus/covid-19-vaccines/distribution/index.html

[12] Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU). (n.d.). *COVID-19 Dashboard*. https://coronavirus.jhu.edu/map.html

emergency under the Stafford Act in March 2020. This Stafford Act declaration was associated with the formation of a Unified Coordination Group (UCG) led by the Federal Emergency Management Agency.

Figure 4: COVID-19 vaccine administration[13]

Without a vaccine or specific treatment available initially, patients with COVID-19 received supportive care in isolation, and exposed individuals were quarantined. NPIs such as mask wearing, contact tracing, social distancing, restricting visitors at hospitals, and restricting travel to infection hotspots were employed to help mitigate disease spread. After a multidisciplinary effort for rapid vaccine development supported by the federal government, academia, and industry, the Food and Drug Administration (FDA) issued an emergency use authorization for the first COVID-19 vaccine on December 11, 2020. Similar authorization followed rapidly for other vaccines, and a nationwide vaccine distribution campaign for adults began.

The introduction of COVID-19 into the U.S. serves as warning for how easily international disease outbreaks can spread across the globe. The COVID-19 experience also highlights the challenges posed by novel or emerging infectious diseases that are contagious from person to person. Two years after the outbreak began, COVID-19 cases continue to challenge healthcare capacities as viral variants emerge and spread. Hospitals in infection hotspots continue to experience staff shortages due to illness and exposure. Meanwhile, the ongoing pandemic continues to strain local and federal response agencies working to protect the nation's health and safety while maintaining the stability of the workforce and the economy. This incident also demonstrates how international travel can rapidly spread communicable diseases worldwide, how a biological incident can seriously disrupt critical infrastructure and global supply chains, how public perception of an incident can impact response and recovery efforts, and how the healthcare sector is essential to the response even while its workers are particularly vulnerable to pathogen exposure.

[13] Miciano, J.V. (2021). *COVID-19 vaccine administered into arm* [Photograph]. DVIDS Hub. https://www.dvidshub.net/image/6606617/covid-19-vaccination-sites

Biological Incident Characteristics

Biological incidents can vary widely in scope and scale, requiring adaptable and flexible plans. Appropriate planning considerations for response to and recovery from such incidents may be better understood if the incidents are described in terms of their defining characteristics.

Defining characteristics for biological incidents include, but are not limited to, whether the incident involves:

- An intentional attack vs. an accidental release vs. a natural outbreak
- A contagious disease vs. a non-contagious disease
- A discrete location of release vs. a wide-area release or outbreak
- A notice vs. a no-notice event
- An agent for which all appropriate MCMs (e.g., diagnostic tests, prophylaxis, therapeutics) are available, for which some MCMs are available, or for which no MCMs are available

Examining the similarities and differences between incidents using these various defining characteristics can help provide planners with a baseline understanding of potential response and recovery considerations and inform corresponding decision-making. For example, an incident involving a few individuals with anthrax, a non-contagious disease, whether intentional or accidental, requires significant resources for mass communication and decontamination. However, such an incident may have limited needs for ongoing medical services, mass care, or sheltering-in-place. An incident involving a contagious biological agent, such as a respiratory pandemic, will necessitate consideration of pathogen detection and mass communication as well as health and medical services. In some cases, pandemics may also generate unique mass care and sheltering-in-place requirements.

Beyond the examples discussed in detail above, many types of biological incidents will require collaboration between emergency management, public health, healthcare, and other community stakeholders to mount an effective response. For example, a vector-borne outbreak could involve multiple partners to help prevent exposure to insects, such as mosquito abatement measures put in place during the WNV outbreak in 2000. A waterborne outbreak such as Legionnaires' disease would involve local water authorities to ensure water systems are treated appropriately and to advise the public on when water is again safe to use. A measles outbreak in young children would need to involve local school districts and childcare facilities to develop and implement a workable response plan. An outbreak of hepatitis A among people experiencing unstable housing or homelessness may require engagement from local social service organizations, shelters, and public safety. Specific characteristics of a particular biological incident will dictate which community stakeholders need to be involved in response and recovery. Cultivating relationships between emergency management, public health, and healthcare planners can help to establish those connections.

During the response to a biological incident, some or all of these defining characteristics may not be immediately known, and this lack of information may impede or frustrate decision-making on the

part of SLTT stakeholders. The key planning factors and considerations discussed in this document are meant to provide planners with the crosscutting knowledge needed to plan for biological incidents, even in the absence of detailed incident characterization early in the response.

Health Equity

Established patterns of public health emergencies tend to disproportionately impact communities that experience health disparities and inequities. Therefore thorough, systematic attention should be given to health equity considerations in all coordination activities and Lines of Effort , in every information-sharing processes, and during every Operational Phase.

In addition to descriptive population health data, health equity considerations should include consideration of how social policies, structures, conditions, and characteristics defining specific places may create differences in exposure risks, social vulnerability, and resilience among diverse populations in emergencies.

RESOLVING ETHICAL ISSUES

The response to and recovery from a biological incident may also entail complex ethical considerations. Recognizing and anticipating these potential conflicts provides an opportunity to create ethical guidelines in advance. A proactive approach to creating ethical guidelines for disasters can be found in the publication *Mass Medical Care with Scarce Resources: A Community Planning Guide.* The following questions should be considered when creating ethical guidelines: [14]

- Who are the stakeholders? Think broadly and include not only persons and categories of persons but institutions, organizations, professions, and communities.
- What is the full range of duties, obligations, and authority of all impacted stakeholders? Think of stakeholders as not only individuals but also institutions and groups.
- How might the various duties and obligations of the principal stakeholders conflict? Be mutually supportive?
- What might be the short- and long-term consequences, both positive and negative, of each possible course of action? How confident is the party in the accuracy of predictions?
- What ethical principles are at stake (e.g., respect for persons, beneficence, non-malfeasance, justice, truth telling, liberty, opportunity, and reciprocity)? Which are in tension?

[14] Roberts, M., Jodge, J.G., Gabriel, E., Hick, J., Cantrill, S., Wilkinson, A., & Matzo, M. (2007). *Mass Medical Care with Scarce Resources: A Community Planning Guide.* Health Systems Research. http://www.calhospitalprepare.org/sites/main/files/resources/Mass%20Medical%20Care%20with%20Scarce%20Resources.pdf

Refer To

- U.S. HHS Administration for Strategic Preparedness and Response (ASPR) Technical Resources, Assistance Center, and Information Exchange (TRACIE) Topic Collection: Ethics webpage for more information on ethics resources

Facts, Assumptions, and Critical Considerations

The following information represents key facts, assumptions, and critical considerations that inform biological incident response and recovery planning and related activities. The importance of each will vary depending on the incident scope, scale, characteristics, and complexity.

FACTS AND ASSUMPTIONS

The following represent the highlights of more detailed discussion regarding general facts and assumptions governing biological incident response and recovery planning presented in the BIA.

- **Authorities**: SLTT governmental public health agencies have primary responsibility and authority for the public health response to biological incidents within their jurisdictions and can implement isolation, quarantine, and movement restrictions that may vary, based on the specifics of the situation, from federal guidance issued by HHS CDC. Determining authorities and responsibilities of SLTT agencies ahead of time and identifying lead agencies for different areas of preparedness and response in line with the legal authorities of individual local agencies will result in more effective and efficient plans. Ideally, planners must understand how prevailing laws, regulations, and/or ordinances may empower or limit government personnel in responding to an emergency and how SLTT elected political leaders or other decision makers may adapt plans to address unique aspects of the incident.

- **Situational Awareness**: At first, full information on the biological threat may not be available. Information on the incident will unfold over the course of the incident, ranging from hours (e.g., declaration of an attack/accident or triggering of an environmental monitoring system), days (e.g., surges of patients reporting to the medical system, pathogen identification, delineation of exposed areas and/populations), or months (e.g., determination of transmission rates, agent lethality, and susceptibility to countermeasures for new agents). Incident cause and/or disease origin may not be readily apparent. Response actions will require many decisions to be made without complete information.

- **Incident Coordination**: Planning and decision-making coordination should occur between SLTT emergency managers, public health officials, healthcare coalitions (HCCs), and community stakeholders (e.g., NGOs) to ensure aligned response activities (e.g., protective measure guidance, positioning of MCM, security, and public messaging).

- **Disease Transmission**: Transmissible pathogens (or infectious diseases) present a threat to response and recovery depending on whether the disease is spread through direct contact (e.g., human-to-human or animal-to-human contact) or indirect contact (e.g., contact with contaminated objects, water, and vector-borne diseases) and whether MCMs exist for the specific pathogen (e.g., diagnostic tests, prophylaxis, therapeutics).

- **Epidemiological Investigations**: Public and animal health epidemiological investigations will use information from various sources (e.g., public health surveillance systems, laboratory testing, patient interviews) to identify the causative agent, source of the agent, mode of transmission, and populations at risk. Investigations will be performed by local public health investigators, with potential involvement by federal experts (e.g., HHS CDC), as appropriate.

- **Criminal Investigations**: During intentional or alleged intentional biological incidents, the DOJ FBI may coordinate joint criminal and epidemiological investigative activities with appropriate SLTT law enforcement partners and other federal agencies.

- **Animal Population Impacts**: While the focus of this document is human disease, some pathogens affecting people may also affect animal health. As discussed further in the FAIA, zoonotic diseases, where a pathogen may move from animal to human communities, require additional collaboration and coordination between multiple agencies for response and recovery. Animal disease may affect a broad range of species including wildlife, zoo, livestock, service, and companion animals, requiring infection control through MCMs (e.g., vaccines) and NPIs (e.g., isolation or depopulation).

- **Environmental Persistence**: Generally speaking, most pathogens rapidly become harmless in the environment (with the exception of waterborne pathogens); however, some select pathogens are environmentally persistent and may require specific decontamination methods.

- **Differential Diagnosis**: Many illnesses have similar initial symptoms and may be undiagnosed or improperly diagnosed until the disease progresses, more cases accumulate, or there is laboratory confirmation of the biological agent involved.

- **Non-Pharmaceutical Interventions (NPIs) and Medical Countermeasures (MCMs)**: Non-pharmaceutical interventions (or community mitigation strategies) are measures that limit the spread of a pathogen, without the use of MCM, and can be applied at the individual or community level. MCMs have been identified and stockpiled to reduce the health impacts of specific, identified biological threats.

CRITICAL CONSIDERATIONS

Critical considerations represent additional key elements of information that planners should take into account when developing a plan. The following represent the highlights of more detailed discussion regarding critical considerations for biological incident response and recovery planning presented in the BIA.

- **Incident Detection**: Capabilities for incident detection may be limited depending on the nature of the biological agent involved and the existence or availability of diagnostic tests for the specific pathogen. Detection strategies are more likely to be through passive recognition systems/surveillance (e.g., monitoring for symptoms), while certain agents may be detected through active systems (e.g., water/air monitoring systems).

- **Malicious Acts**: A suspected or actual intentional biological threat, including a suspected terrorist threat, will require close coordination between the public health and law enforcement communities, and potentially the counterterrorism community, as the threat or incident evolves.

- **Authorities**: During a response where federal or SLTT authorities conflict or intersect, critical legal and policy decisions will be required and may be elevated to higher levels of government for resolution (e.g., movement restrictions, prioritization of distribution for personal protective equipment [PPE], civil order). Planning efforts also should consider the fact that specific authorities at the state and local level, as well as specific legal relationships between state and local governments, vary greatly across jurisdictions within the U.S.

- **Public Information**: During an incident, there will be a time-sensitive demand for guidance and other information from the public and from partners. Top priorities will be communication of risk of exposure, exposure guidance, signs and symptoms, availability of MCMs, and protective actions. Communications must synthesize complex medical and health information to promote public compliance with government guidance.

- **Behavioral and Mental Health Impacts**: Behavioral and mental health impacts (e.g., depression, anxiety, post-traumatic stress disorder) due to stress, restrictions, and messaging may be significant and should be anticipated. Negative perception of individuals, families, ethnic/racial groups, or certain professions may also become associated with the incident via media/social media and other sources of reporting. The public's response to a biological incident may be quite different than after other types of natural disasters (in which communities naturally often come together) because of the ongoing hazard posed by transmissible agents.

- **Disproportionate Responder and Receiver Community Impacts**: Depending on the agent and the nature of the incident, responders and first receivers may be disproportionately impacted physically and mentally due to increased exposure, frequent changes in operational environment, limited resource availability, working conditions, concerns about exposed or ill family members, childcare challenges, and increased demand for services.

- **Vulnerable Populations**: Vulnerable populations may experience disproportionate harm from a biological incident, including increased risk of infection or disease burden, loss of income, etc., and may face barriers to implementing disease prevention/mitigation measures. These increased risks may stem from use of multi-generational or public housing, lack of access to medical or behavioral health treatment, employment type, and public transport use.

- **Continuity of Operations (COOP)/Continuity of Government (COG)**: The implementation of COOP planning and COG activities may vary depending on the pathogen's impact on the workforce, essential services, etc.

- **Economic Impacts**: A communicable disease may impact local economies through business closures, capacity limitations, workforce reductions, or resource competition. A large-scale incident may affect national and global markets, supply chains, and production capacities.

- **Medical Countermeasure (MCM) Development, Production, and Distribution:** MCM availability, overwhelming public demand, and requests beyond impacted areas may complicate MCM distribution. For pathogens with limited or no available pharmaceutical MCMs, MCM development and production may take considerable time.

- **Significant Resource Shortfalls**: The size, scope, and/or complexity of a biological incident may overwhelm existing local capabilities and resources. Mutual aid agreements with neighboring jurisdictions can provide support prior or in addition to federal resource engagement. Resources may be limited regardless of pathogen. Competition between various jurisdictional levels of government and the private sector may occur in the absence of proper coordination to promote judicious resource distribution.

- **Decontamination**: While most biological agents are inactivated in the environment via natural processes, some pathogens are environmentally persistent and specialized decontamination processes are required to eliminate the threat they pose. Decontamination of buildings or public spaces from such agents could require their long-term or permanent closure.

- **Public Safety**: Authorities must consider public safety and security during implementation of response and recovery measures (e.g., security at MCM-dispensing areas and at healthcare and public health critical infrastructure).

- **Waste Management**: Agent identity and pathogen type may have an impact on available/approved waste processing and disposal options; disposal of large quantities of hazardous biological waste will prove challenging and will likely tax existing resources.

- **Fatality Management**: Standard mechanisms used to process hazardous human remains may be overwhelmed by incidents that result in a large number of fatalities. Additionally, evidence from human remains may need to be recovered and preserved as part of ongoing law enforcement investigations. Planning must also account for hazardous animal remains and any related special considerations.

- **Achieving Recovery Outcomes**: Recovery of the impacted populations and environments may take an extended amount of time and involve restoring critical infrastructure, rebuilding public trust, supporting economic recovery, and disposing of hazardous waste, among other priorities.

Considerations such as these appear throughout this document. Planners should keep them in mind while developing preparedness plans and activities appropriate for their community.

Relevant Authorities and Legislation

When response and recovery resource needs surpass the available capabilities of SLTT officials, federal support will be required. Several levels of federal emergency declarations can help support biological incident response and recovery, ranging from a public health emergency declaration by the Secretary of HHS to an emergency or major disaster declaration under the Stafford Act granted by the President upon request from a state governor, tribal leader, or other designated official.

In a biological incident, the following declarations may be issued and may influence incident response and recovery in unique ways. It is important to consider that many prior biological incidents have been addressed without any of the following declarations. Moreover, states or territories can issue their own public health emergency declarations at their discretion, and SLTT declarations are likely to occur with greater frequency than any federal or international declarations. Additionally, the federal and international declarations, reviewed in Table 1 below, will often overlap with SLTT declarations for the same incident as the impacts and support needs expand over time.

Table 1: Relevant Federal and International Declarations

Type of Declaration	Issuing Entity	Authority
Declaration of Public Health Emergency	Secretary of the U.S. Department of Health and Human Services (HHS)	Section 319 of the Public Health Services Act (PHSA)
Presidential Declaration of a National Emergency	President of the United States of America	Section 201 of the National Emergency Act
Emergency or Major Disaster Declaration	President of the United States of America	Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)
Declaration of Public Health Emergency of International Concern (PHEIC)	World Health Organization (WHO)	International Health Regulations (IHR) (2005)

For detailed descriptions of declaration types and more information on federal response and recovery support for a biological incident, readers are directed to the BIA. For additional explanation of funding sources for Stafford and non-Stafford incidents, readers are directed to Appendix C of this document.

In December 2006, Congress passed and the President signed the Pandemic and All-Hazards Preparedness Act (PAHPA), Public Law No. 109-417. Among other things, this act amended the Public Health Service Act to establish within HHS a new Office of the Assistant Secretary for

Preparedness and Response, which was elevated to an operational division in 2022 and is now the Administration for Strategic Preparedness and Response. It also provided new authorities for several programs, including the advanced development and acquisitions of medical countermeasures, and called for the establishment of a quadrennial National Health Security Strategy. Subsequently, the Pandemic and All-Hazards Preparedness Reauthorization Act (2013) and the Pandemic and All-Hazards Preparedness and Advancing Innovation Act (PAHPAIA, 2019) were signed into law and build on work undertaken to advance national health security. These acts authorized funding for public health and medical preparedness programs, such as the Hospital Preparedness Program (HPP) and the Public Health Emergency Preparedness (PHEP) Cooperative Agreement and amended the Public Health Service Act (PHSA) to grant state health departments greatly needed flexibility in dedicating staff resources to meeting critical community needs in a disaster. Most recently, PAHPAIA also authorized new public health and medical preparedness programs for regional healthcare preparedness and military and civilian partnerships.

Planners are directed to HHS CDC's PHEP Cooperative Agreement and HHS ASPR's HPP for more information on how these initiatives can support collaboration between emergency management, public health, and HCCs in SLTT jurisdictions. HPP focuses on building HCCs, which incentivize diverse and often competitive healthcare organizations with differing priorities to work together to prepare for and respond to events that threaten the public's health. Serving as both coordinating entities and response bodies, HCCs help ensure that their members have the necessary medical equipment and supplies, real-time information, communication systems, and trained personnel to respond to emergencies. Each HCC must include four core member types: acute care hospitals, public health agencies, emergency medical services (EMS), and emergency management agencies.[15]

Refer To

- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018) for additional information on public health preparedness and guidance on planning, operationalization, and evaluation of SLTT capabilities across 15 areas, including organization, prioritization, and resource investment decisions
- HHS CDC Public Health 101 Series provides an introduction to public health and is designed for persons new to public health
- HHS CDC Public Health Emergency Preparedness (PHEP) Cooperative Agreement webpage
- HHS ASPR Hospital Preparedness Program (HPP) webpage

[15] Office of the Assistant Secretary for Preparedness and Response. (2018, August 17). *Hospitals and Health Care Coalitions* [Fact sheet]. HHS. https://www.phe.gov/Preparedness/news/events/NPM18/Pages/health-care-community.aspx; Assistant Secretary for Preparedness and Response. (2021, April). *Health Care Coalitions (HCCs)* [Fact sheet]. HHS. https://www.phe.gov/Preparedness/planning/hpp/Documents/HCC-FactSheet-April2021-508.pdf

- HHS ASPR TRACIE Topic Collection: Healthcare Coalition Resources webpage for more information on HCC resources
- FEMA *Biological Incident Annex to the Response & Recovery Federal Interagency Operational Plan* (2017)
- This information is supplemental to the FIOPs and other subordinate plans. The BIA and accompanying documents do not alter or impede the ability of any state, local, tribal, territorial, insular area, or federal agency to execute authorities or meet responsibilities under applicable laws, executive orders, and directives

KPF 1: Detect and Characterize the Threat

Timely detection and accurate characterization of a biological incident are key components of an effective response. Early actions such as incident detection and characterization, resource mobilization, and disease containment can save lives. In the context of the malicious use of a biological agent, prompt detection and precise characterization can also help prevent and/or mitigate a potential follow-on incident. Biological incidents are primarily detected through human health surveillance systems and environmental monitoring barring the presence of an overt indication (e.g., a white powder, intelligence, an eyewitness to an intentional release, announcement of attack, etc.). While public health officials will primarily lead detection and characterization activities, emergency management planners should be familiar with the processes for detection and characterization and how to support these efforts to mitigate incident impacts, maximize the safety of responders, forecast potential resource coordination needs, and determine how the specifics of the biological agent or disease involved may affect various aspects of the response under their charge.

1.1 Initial Detection

Initial detection is an activity essential to limiting the harm caused by the incident and triggering the appropriate response. Many biological agents can take days to cause symptoms, contributing to a delay in incident detection. Similarities of symptoms across pathogens may contribute to delays in detection or initial mischaracterization of an incident, such as detection of emerging diseases or intentional attacks during annual flu season. In some instances, detection may occur only after the outbreak/incident is well underway, resulting in potentially large numbers of infections prior to initial detection. Detection strategies include:

- **Passive surveillance** is a system by which hospitals, clinics, and/or other sources submit reports to a health department as part of their routine duties. Relatively inexpensive, passive surveillance is used to monitor individuals and populations for signs that a disease outbreak may be occurring. Data may be incomplete, and timeliness of reporting may vary, as passive surveillance depends on individuals in various institutions to submit information.[16]

- **Active surveillance** is a system by which health department staff regularly contact healthcare facilities or members of the public to inquire about health conditions. Relatively expensive compared to passive surveillance, active surveillance provides more accurate and timely

[16] Nsubuga, P., White, M.E., Thacker, S.B., Anderson, M.A., Blount, S.B., Broome, C.V., Chiller, T.M., Espitia, V., Imtiaz, R., Sosin, D., Stroup, D.F., Tauxe, R.V., Vijayaraghavan, M., & Trostle, M. (2006). Public Health Surveillance: A Tool for Targeting and Monitoring Interventions. In: Jamison DT, Breman JG, Measham AR, et al., (Eds.), *Disease Control Priorities in Developing Countries*. 2nd edition. Co-published by The International Bank for Reconstruction and Development/The World Bank and Oxford University Press. https://www.ncbi.nlm.nih.gov/books/NBK11770/

information.[17] Active surveillance also includes systems that are designed to detect biological agents in the environment (generally air or water). They offer quick recognition of a biological incident, but their widespread use faces many technological and practical hurdles. Examples include identification from BioWatch, water system monitoring, wastewater monitoring, etc.

Table 2: Comparing Types of Public Health Surveillance[18]

Passive Surveillance	Active Surveillance
Diseases are reported by healthcare providers	Health agencies contact health providers, seeking reports
Simple and inexpensive	Ensures more complete reporting of conditions
Limited by incompleteness of reporting and variability of quality	Used in conjunction with specific epidemiologic investigation

To best protect the population, a combination of both active and passive detection systems, analysis of human health effects, monitoring signs in the environment and local animal populations, and observing other features of an incident should be employed at the community level, whenever possible. Many surveillance systems are designed to detect an incident following the occurrence of symptoms of disease, and it is possible that an incident may be well underway before it is detected. With the assistance of detection systems and effective communication, authorities can recognize biological incidents and initiate an appropriate response as early as possible. (Refer to Appendix B for more information on sources of incident detection and examples of initial information received, information verification process, and associated methods of information sharing.)

1.1.1 COMMON CHALLENGES FOR PASSIVE AND ACTIVE SURVEILLANCE ACTIVITIES

Correctly identifying the pathogen causing an outbreak is a complex undertaking. Detecting infectious diseases in a timely manner can be difficult in both passive and active surveillance systems. Common challenges facing both types of surveillance activities include:

- The incubation period of a disease is the lag time between exposure to the pathogen and the onset of symptoms. In patients who have been infected but have not yet become sick, this lag can delay testing, treatment, and prophylaxis that may mitigate illness. Exposed individuals will continue to circulate and, in the case of a contagious disease, possibly expose others. For some

[17] Nsubuga, P., White, M.E., Thacker, S.B., Anderson, M.A., Blount, S.B., Broome, C.V., Chiller, T.M., Espitia, V., Imtiaz, R., Sosin, D., Stroup, D.F., Tauxe, R.V., Vijayaraghavan, M., & Trostle, M. (2006). Public Health Surveillance: A Tool for Targeting and Monitoring Interventions. In: Jamison DT, Breman JG, Measham AR, et al., (Eds.), *Disease Control Priorities in Developing Countries*. 2nd edition. Co-published by The International Bank for Reconstruction and Development/The World Bank and Oxford University Press. https://www.ncbi.nlm.nih.gov/books/NBK11770/

[18] CDC. (n.d.) *Public Health 101 Series: Introduction to Public Health Surveillance*. Division of Scientific Education and Professional Development. https://www.cdc.gov/training/publichealth101/documents/introduction-to-surveillance.pdf

diseases, a portion of infected individuals may never become sick. These individuals remain asymptomatic but still contagious, which can even further delay testing, treatment, and effective community surveillance.

- Many infectious diseases start with general symptoms and require additional testing to determine the definitive cause of the illness.
- Laboratory results that conclusively identify the biological agent may not be available for days.
- Diagnostic and screening methods for new or emerging pathogens may not exist.
- The wide variety of potential agents (e.g., bacteria, viruses, parasites, fungi, or biological toxins) precludes any single system from being able to detect them all.
- Lack of access to screening or testing services due to geographic, socioeconomic, or other factors may prevent the detection of disease among certain populations. Incomplete data could lead to inaccurate estimates of disease prevalence in the community.

1.1.2 PASSIVE SURVEILLANCE SYSTEMS: HUMAN HEALTH

Human health surveillance systems continuously monitor for changes in natural patterns and presence of disease, an increase in the number or severity of cases of a specific disease, unusually severe cases of a disease, unusual geographic spread of disease, and unseasonal clusters of a disease. Surveillance systems rely on the continuous collection, analysis, and interpretation of health-related data.[19] CDC's PulseNet uses molecular subtyping tools to generate DNA fingerprints of bacteria making people sick. This national laboratory network connects foodborne, waterborne, and One Health[20]–related illness cases to detect thousands of local and multistate outbreaks.[21] Passive surveillance data also include traditional case-reporting of diseases that may present a public health threat and are required to be reported by law to public health authorities by local physicians and hospitals.[22]

In addition to traditional methods, syndromic surveillance systems are also used to track disease indicators that occur before clinical diagnosis, such as chief complaint data from urgent medical visits, over-the-counter medication purchases, school absenteeism rates, and keyword (e.g., "fever,"

[19] WHO. (2022). *Universal Health Coverage.* http://www.who.int/topics/public_health_surveillance/en/

[20] One Health is a collaborative, multisectoral, and transdisciplinary approach—working at the local, regional, national, and global levels—with the goal of achieving optimal health outcomes recognizing the interconnection between people, animals, plants, and their shared environment. More information may be found at https://www.cdc.gov/onehealth/index.html.

[21] CDC. (2021). PulseNet [webpage]. NCEZID, Division of Foodborne, Waterborne, and Environmental Diseases (DFWED). Accessed: August 17, 2022. https://www.cdc.gov/pulsenet/index.html

[22] CDC. (2022, February 8). *MMWR: Summary of Notifiable Infectious Diseases*. HHS. https://www.cdc.gov/mmwr/mmwr_nd/

"vomit") presence on social media platforms. Information from these systems may provide the first indication that a biological incident has occurred. For example, doctors' offices, urgent care facilities, and/or emergency departments may report an influx of patients with similar and/or unusual symptoms, or syndromic surveillance systems may report an uncharacteristically high volume of over-the-counter flu medicine purchases. Syndromic surveillance works best when local doctors, hospitals, pharmacies, schools, etc., are aware, alert, and reporting activities in their localities. In addition, mortality surveillance and unusual death reporting also play roles in detection.

Figure 5: National Syndromic Surveillance Program (NSSP) Biosense Platform, a secure integrated electronic health information system with standardized analytic tools and processes

Surveillance system collection strategies and outputs vary by state and may provide immediate data, such as during active investigations, or may experience delays of weeks before passive reporting of data for some diseases are available. An example of a national syndromic surveillance system is the CDC's National Syndromic Surveillance Program (NSSP), which provides public health officials with a timely system for detecting, understanding, and monitoring health events. By tracking symptoms of patients in emergency departments – before a diagnosis is confirmed – public health can detect unusual levels of illness to determine whether a response is warranted.

1.1.3 PASSIVE SURVEILLANCE SYSTEMS: VETERINARY HEALTH

Veterinary surveillance systems may also provide an early warning that a biological incident has occurred. Some pathogens are zoonotic, meaning that they can spread between animals and humans.[23] CDC's One Health surveillance, where human, animal, and environmental surveillance systems are linked, would promote early recognition of an incident caused by a zoonotic pathogen. In some cases, infected animals (e.g., wildlife, livestock) may act as a sentinel for an outbreak, providing the first indication that something out of the ordinary is happening. In all cases, communication between veterinary and public health communities is essential to biological incident detection. As with human disease surveillance systems, the timeliness of data collection by veterinary surveillance systems and communication with public health officials may determine if an unfolding disease outbreak can be mitigated quickly and effectively.

[23] CDC, NCEZID. (2021, July 1). *Zoonotic Diseases*. HHS. https://www.cdc.gov/onehealth/basics/zoonotic-diseases.html

The introduction of WNV to the U.S. in 1999 provides an illustrative example of the utility of monitoring animal health for the prevention and mitigation of zoonotic disease outbreaks. One Health collaboration between public health epidemiologists investigating the cause of illness for several elderly people developing signs of encephalitis and veterinary pathologists investigating the cause of death for rising numbers of affected birds in the same area ultimately led to the identification of WNV as the cause of illness in both species and as an emerging disease. WNV's introduction instigated the largest human encephalitis epidemic of its kind seen in the U.S., and WNV remains the most frequent cause of insect-borne disease in the U.S. Since WNV is transmitted by mosquitoes to both bird and human populations, monitoring infections in wild and/or captive birds can help determine whether WNV is active in a region, and in some cases, provide a quantitative index of risk for human infections. Monitoring birds is especially important because human case reports are lagging indicators of risk, occurring weeks after infection.

Figure 6: New York State wildlife pathologist examines a dead crow for signs of WNV infection[24]

Testing of animal samples to confirm disease may be performed by U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS)-approved state, university, and private animal diagnostic laboratories; the CDC; the National Veterinary Services Laboratories (NVSL, the nation's animal health reference laboratory for animal diseases); or members of the National Animal Health Laboratory Network (NAHLN), which can test large numbers of samples for specific disease agents originating from food animals.

Refer To

- USDA APHIS laboratory portal for information on the NVSL, the NAHLN, and other laboratories that provide suspected animal disease outbreak testing services

[24] Jennings, D. (n.d.). *A New York State wildlife pathologist examines a dead crow* [Photograph]. https://source.wustl.edu/2015/11/whatever-happened-to-west-nile/

- CDC One Health and Healthy Pets, Healthy People webpages for information on zoonotic diseases and related One Health issues in livestock, companion animals, and wildlife
- For issues related to livestock and poultry, refer to the *National Food and Agriculture Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (FAIA; FIOPs) (2019)

1.1.4 SPECIFIC CHALLENGES FOR PASSIVE SURVEILLANCE ACTIVITIES

While passive surveillance systems have numerous benefits, they also present specific challenges. Many factors delay detection of biological incidents and proper agent identification via passive systems, such as:

- Healthcare providers (human and veterinary) juggle many competing daily priorities. Their participation in disease monitoring and reporting activities directly improves the robustness of surveillance systems, but other demands on their time may prevent consistent participation.
- Case reporting does not happen in real time, and there may be a delay before illnesses are captured by a surveillance system.
- Syndromic surveillance systems (such as those that look at sick days, over-the-counter drug sales, keyword searches, etc.) can be subject to natural distortions.

Recognizing these challenges, early detection and accurate identification are often key to ensuring appropriate treatment and mitigation strategies are implemented as quickly as possible to prevent illnesses and save lives. Due to the importance of early detection, the homeland security and public health communities are continually working toward overcoming these challenges.

1.1.5 ACTIVE SURVEILLANCE SYSTEMS ENVIRONMENTAL MONITORING

Environmental monitoring systems can provide early warning in the event of a biological agent release and enable detection of a biological incident before exposed individuals begin to show symptoms and seek treatment. In response to the COVID-19 pandemic, CDC developed and launched the National Wastewater Surveillance System (NWSS) to coordinate and build the nation's capacity to track the presence of SARS-CoV-2 in wastewater samples collected across the country. This type of surveillance may be increasingly useful for multiple agents in the future.[25]

Another example of such an environmental monitoring system has been the Department of Homeland Security (DHS)'s BioWatch program, a federally managed, locally operated air monitoring system that tests for selected pathogens. The BioWatch program operates in more than 30 jurisdictions across the U.S., including at least one city in every FEMA region. BioWatch collectors

[25] CDC. (2022, March 21). *National Wastewater Surveillance System (NWSS).* NCEZID, DFWED. https://www.cdc.gov/healthywater/surveillance/wastewater-surveillance/wastewater-surveillance.html

sample air continuously, with particles collected onto a removable filter. Typically, filters are retrieved from the collectors every 24 hours and are transported to laboratories for processing and analysis. Following identification of particular threat agents, additional samples can be taken to determine agent viability and concentration. Based on testing results, jurisdictional response activities including the notification of local and federal entities will be initiated as appropriate.[26] The Biological Detection for the 21st Century program, which is under development, seeks to provide faster detection and other improved capabilities.[27] (Refer to Appendix A for more information on BioWatch.)

Figure 7: BioWatch air-monitoring device

1.1.5.1 Drinking Water System Monitoring

Drinking water that is not properly treated or disinfected or that travels through an improperly maintained distribution system may pose a communitywide health risk as a potential source of pathogen exposure.[28] In fact, the CDC's most recent report of drinking water–associated outbreak surveillance data (obtained through the National Outbreak Reporting System [NORS]) indicates

[26] Institute of Medicine and National Research Council. (2011). *BioWatch and Public Health Surveillance: Evaluating Systems for the Early Detection of Biological Threats: Abbreviated Version*. National Academies Press. https://doi.org/10.17226/12688

[27] Department of Homeland Security (DHS). (2020). *DHS Biosurveillance Systems*. Science and Technology Directorate and Countering Weapons of Mass Destruction Office. https://www.dhs.gov/sites/default/files/publications/st_cwmd_-_dhs_biosurveillance_systems.pdf

[28] U.S. Environmental Protection Agency (EPA). (2004). *Understanding the Safe Drinking Water Act*. https://www.epa.gov/sites/default/files/2015-04/documents/epa816f04030.pdf

dozens of annual outbreaks in the U.S., resulting in the sickening of hundreds of individuals and a few deaths.[29]

Water system monitoring is a complex process involving federal requirement setting, state inspection and enforcement, and local utility tracking and reporting. Pursuant to the Safe Drinking Water Act as amended in 1996, the U.S. Environmental Protection Agency (EPA) requires that public water systems protect drinking water from microbial contaminants (e.g., *Cryptosporidium*, *Giardia*, *Legionella*, coliform bacteria, and viruses). Under this law, local water systems are directed to monitor for selected common contaminants of concern as well as substances that could be sources of pathogens, such as animal wastes. Additionally, toxins produced by harmful algal blooms are another common cause source of waterborne disease outbreaks that often are actively monitored. Chlorine-based disinfectants are generally used to protect public health in water systems; at the same time, levels of disinfectant byproducts also must be controlled.[30] Some non-utility sources, such as private wells, river sources, and self-contained sources (such as some hospitals, etc.) fall outside of existing monitoring systems. In addition, intentional contamination of a water supply is a potential threat that SLTT planners should consider. Intentional contamination of a building's water supply (e.g., schools, offices, etc.) could sicken many and create fear throughout the community.

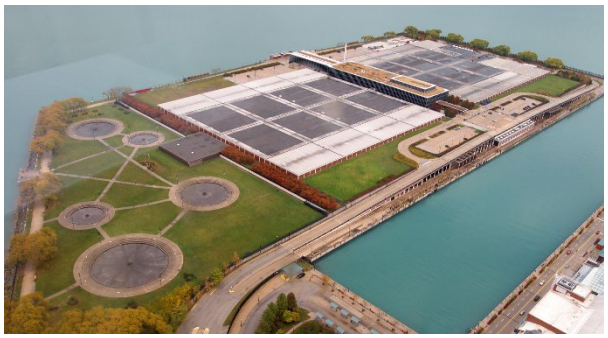

Figure 8: James W. Jardine Water Purification Plant in Chicago[31]

When monitoring or credible intelligence indicates that public health may be in danger due to water contamination, water suppliers are required to notify their local public health department. Together,

[29] Benedict, K.M., Reses, H., Vigar, M., Roth, D.M., Roberts, V.A., Mattioli, M., Cooley, L.A., Hilborn, E.D., Wade, T.J., Fullerton, K.E., Yoder, J.S., Hill, V.R. (2017, November 10). Surveillance for waterborne disease outbreaks associated with drinking water — United States, 2013–2014. *Morbidity and Mortality Weekly Report, 66*(44), 1216–1221. https://www.cdc.gov/mmwr/volumes/66/wr/mm6644a3.htm?s_cid=mm6644a3_w

[30] EPA. (2022, January 26). *National Primary Drinking Water Regulations.* https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations; EPA. (2010). *Comprehensive Disinfectants and Disinfection Byproducts Rules (Stage 1 and Stage 2): Quick Reference Guide*. Office of Water. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100C8XW.txt

[31] Trevino, J. (n.d.). *James W. Jardine Water Purification Plant in Chicago* [Photograph]. https://drinkingwater123.metroplanning.org/meet-your-water-an-introduction

public health organizations can determine an appropriate course of action; such solutions may include changing water sources, altering treatment, temporary system shutdowns, and/or issuing drinking water advisories. Moreover, the activation of drinking water advisories and the establishment of alternate water supplies are a core part of local emergency planning in most areas of the U.S., allowing for maintaining public safety while characterizing the extent of the drinking water threat.

Refer To

- EPA *A Water Security Handbook: Planning for and Responding to Drinking Water Contamination Threats and Incidents* (2006) for more information on planning for incidents involving a contaminated water supply
- CDC National Wastewater Surveillance System (NWSS) webpage for more information on wastewater surveillance

1.1.6 SPECIFIC CHALLENGES FOR ACTIVE SURVEILLANCE SYSTEMS

Although environmental monitoring systems can play an important role in incident detection, they face substantial challenges. Detection of biological agents by such systems is difficult for many reasons, including:

- Inability to detect novel, emerging, or any pathogens outside of the environmental monitoring system's specific targeted configuration
- A concentration of biological agent below the system's limit of detection leading to device being unable to detect sample (false negative)
- Inability to distinguish between harmful and benign pathogens, intentionally released and naturally occurring pathogens, and infectious and noninfectious pathogens

In addition, there are logistical, analytical, and cost constraints that preclude the widespread use of these monitoring systems. Environmental monitoring systems are expensive and require significant maintenance to provide meaningful surveillance for most of the U.S. Also, responding effectively to a biological attack is costly, including the disruption and turmoil such a response may cause. Therefore, given that biological attacks are incredibly rare, a monitoring system must be highly certain that an attack, rather than a benign incident, is taking place. For this reason, environmental monitoring systems are often used to cue more robust epidemiological investigations to truly determine if an attack has taken place before other actions are initiated.

Figure 9: Sampling to determine contamination

1.2 Response Initiation

The goal of disease reporting and pathogen recognition systems is to provide adequate warning to communities and stakeholders and enable them to initiate an appropriate response. To ensure surveillance system signals trigger a proportionate response, planners should include surveillance systems within plans for a holistic biological incident recognition and response Concept of Operations (CONOPS). The response itself should be led by appropriate knowledgeable entities and include collaboration and coordination among local public health departments, emergency management agencies, and HCCs. These entities will work with the education, transportation, environmental, and housing sectors to support impacted communities.

Key Objectives for Multi-Jurisdictional Emergency Management in a Biological Incident

Confirm whether the disease outbreak constitutes a real or potential biological incident and consider whether the incident may involve an emerging pathogen and/or develop into a large-scale incident with the potential to overwhelm federal. state, local, tribal, and territorial (FSLTT) public health and medical resources.

- Has an index case been suspected or confirmed and reported to appropriate SLTT public health entities?
- Have healthcare facilities seen an influx of patients with similar disease symptoms indicating an emerging pathogen?
- Has a novel or atypical pathogen been identified by overseas laboratories or FSLTT public health entities (e.g., Laboratory Response Network [LRN])?

Ensure multiple surveillance and detection systems at all FSLTT levels are coordinated to inform public health and emergency management authorities in a timely manner so that appropriate and prompt decisions can be made to protect the public and critical resources.

Ensure ongoing coordination and exchange of credible scientific information about an emerging biological incident between FSLTT and private sector entities (e.g., hospitals, urgent care facilities, etc.).

Initiate efforts to perform infectious disease modeling as well as atmospheric outdoor or indoor release modeling to understand potential public health impacts to susceptible communities and critical infrastructure. (Refer to Planning, Decision-Support, and Modeling Resources for Biological Incidents section of this document for more information on modeling and decision-support considerations.)

Coordination Opportunity

Work with public health and environmental health experts, community leaders, and stakeholders to support decision-making. Facilitate collaboration of public health, animal health, and emergency management communities to share surveillance results to aid biological incident detection and facilitate a timely and effective response.

Action Item

- Exercise biological incident recognition and response CONOPS and associated procedures in coordination with private sector, public health, and public safety agency staff.
- Connect with public health to determine the capabilities of active and passive detection systems in your jurisdiction. Determine the history and challenges of these systems to better understand how they should be incorporated into your plan.
- Seek out training and exercise opportunities with other FSLTT partners regarding surveillance systems to ensure the proper support from emergency management is included across plans.

What Will You Need To Know?

☐ Which human and veterinary health surveillance systems operate in your region?

- What do they do?
- How do they report?
- To whom do they report?
- When is the report available?

☐ Which diseases are reportable in your region?

☐ Which pathogens are endemic in your region?

☐ What environmental monitoring systems exist in your region?

- What do they do?
- How do they report?
- To whom do they report?
- When is the report available?
- What percentage of the population is covered and where?

☐ How and when will emergency management be engaged in response if a biological agent is identified by active or passive surveillance systems and verified by your public health authorities?

☐ What support for resource management and stakeholder engagement can emergency managers provide for the public health authorities in your jurisdiction?

1.3 Incident Characterization

Characterization involves determining the extent of the incident and verifying the identity, and infectivity of the involved pathogen. Relevant, timely, and accurate incident characterization enables situational awareness, informs decision-making, and facilitates efficient response. Properly characterizing the incident will help reduce morbidity and mortality, ensure the effective use of resources, prevent the spread of contamination and occurrence of secondary infections, and reduce the overall economic impact of the incident.

Full characterization of a biological incident is unlikely to be immediately feasible. Incident characterization involves collecting, analyzing, and synthesizing data from numerous sources and is an iterative process; as new information becomes available, characterization of the incident is refined. Incident characterization may take hours (e.g., pathogen identification), days (e.g., exposure areas and/or populations), or months (e.g., attack and secondary attack rates, lethality, susceptibility to countermeasures) to accomplish. Therefore, in the early stages of a biological incident, decisions will likely need to be made without complete or validated information.

1.3.1 LABORATORY TESTING

Pathogen/disease identification and characterization, source identification, and understanding geographic dispersion are essential components of incident characterization. Clinical and environmental samples should be tested and genetically typed where possible to determine their provenance (whether natural or lab-made), virulence, and best treatment options.

Testing of patient samples begins locally at public health laboratories and clinical laboratories. Depending on the nature of the incident, clinical sample testing from suspect cases by CDC's Laboratory Response Network for Biological Threats (LRN-B) may be required to verify the identity, viability, and infectivity of the involved pathogen. LRN-B's mission is to provide a rapid laboratory response to biological threats to inform critical decisions about public health and safety, and it was

established to facilitate quick and accurate detection of biothreat agents and emerging infectious diseases in the U.S.[32]

Refer To

- CDC LRN-B webpage for more information on LRN-B's tiered structure including national labs (CDC, U.S. Army Medical Research Institute of Infectious Diseases, and the Naval Medical Research Center), reference labs (~130 state and local public health, military, veterinary, agriculture, food, and water testing labs), and sentinel labs (private sector clinical labs)

Laboratories that can support testing to address agent identification and characterization needs may be represented within the Integrated Consortium of Laboratory Networks (ICLN)—a federal partnership between DHS, Department of Defense (DoD), HHS, USDA, Department of Energy, Department of Interior (DOI), DOJ, Department of State (DOS), and the EPA— to coordinate laboratory response capabilities during a crisis. The ICLN includes some of the following networks: DoD Laboratory Network, Environmental Response Laboratory Network, LRN, NAHLN, and the Veterinary Laboratory Investigation and Response Network.

Figure 10: Scientists analyzing incident samples

While testing occurs to determine the agent, a case definition (described in the call out box below) is used by public health officials to help distinguish potential cases from those presenting to the medical system so that they can be investigated, and their exposures reviewed to identify a source. Separate guidance is developed to assist healthcare providers in diagnosis and treatment of suspected clinical cases. During early phases of a biological incident caused by a novel pathogen, testing capabilities may be inadequate and case definitions become very important. Even when testing capability is available, certain testing methods may pick up lingering disease traits (e.g., prolonged positive polymerase chain reaction) that do not imply that the patient may need further

[32] CDC. (2019, April 10). *LRN-B Enables a Rapid Laboratory Response to Biological Threats* [Fact sheet]. https://emergency.cdc.gov/lrn/lrnbfactsheet.asp

treatment or infect others, so case definitions are still required for both clinical and public health decision-making.

Case Definition

A case definition is a set of standard criteria for classifying if a person has a particular disease, syndrome, or other health condition. Case definitions are typically established by an epidemiologist within a public health office and change over time as more information is obtained. Some case definitions, particularly those used for national surveillance, have been developed and adopted as national standards that ensure comparability. A case definition consists of clinical criteria and, sometimes, limits on time, place, and person. The clinical criteria usually include confirmatory laboratory tests, if available, or combinations of symptoms (subjective complaints), signs (objective physical findings), and other findings. Case definitions used during outbreak investigations are more likely to specify limits on time, place, and/or person than those used for surveillance.[33] (For example, set of limits could be people who ate from the seafood buffet at Smith's restaurant from August 5-15.)

In the event of an intentional biological attack, determining the source and geographic dispersion of the agent will assist public health and law enforcement investigators in determining the scope of the incident and in identifying potentially exposed individuals. The geographic origin of the incident may not be readily apparent; moreover, because days may elapse between exposure to the agent and the onset of illness, the first detected cases may not be proximate to the location of the initial infection or release. The extent of contamination is identified through means such as epidemiological investigations and environmental sampling. Data are fed into national models for narrowing the range of likely release points and amount of agent used (Refer to the Planning, Decision Support, and Modeling Resources for Biological Incidents of this document).

Coordination Opportunity

Develop relationships with federal, state, regional, and local agencies with a role in biological incident response. Identify partners that can provide subject matter expertise to aid in pathogen identification and site assessment. Review past biological incidents in your jurisdiction and consider:

- Which relationships/partners are key to a successful response?
- Which relationships need strengthening?

[33] CDC. (2021, April 16). *Surveillance Case Definitions for Current and Historical Conditions.* National Notifiable Diseases Surveillance System (NNDSS) Division of Health Informatics and Surveillance. https://ndc.services.cdc.gov/

- What new partnerships need to be established, based on lessons learned or past after-action reviews?
- How are all relevant data aggregated, and how is it used to inform the initial response, including public messaging, resource coordination, etc.?

Coordinate with public health authorities to identify laboratories (e.g., state and local public health, academic hospital, non-academic hospital, and independent labs) in your jurisdiction and to determine capabilities and capacity for response.

Action Item

Work with public health authorities to establish support within plans related to incident detection and characterization for:

- Determining the extent of spread of the biological agent
- Additional resources needed for incident characterization
- Stakeholder engagement and communication to the public
- Incorporation of modeling tools and associated considerations

What Will You Need To Know?

- ☐ What is the case definition of the disease to inform healthcare providers?
- ☐ What testing capabilities and capacities are available within your jurisdiction or will require coordination with resources outside of your jurisdiction? How can emergency managers best facilitate resource procurement or coordination when needed?

1.3.2 EPIDEMIOLOGIC INVESTIGATIONS

When an outbreak is suspected, public health department personnel may initiate an epidemiologic investigation to determine the cause. A field investigation has ten steps:[34]

1. Prepare for field work.
2. Confirm the diagnosis.
3. Determine the existence of an outbreak.

[34] King, M.E., Bensyl, D.M., Goodman, R.A., & Rasmussen, S.A. (2018). Conducting a Field Investigation. In S.A. Rasmussen & Goodman, R.A. (Eds.), *The CDC Field Epidemiology Manual.* Oxford University Press. https://www.cdc.gov/eis/field-epi-manual/chapters/Field-Investigation.html#anchor_1543842271

4. Identify and count cases (i.e., create a case definition and develop a line listing).
5. Tabulate and orient the data in terms of time, place, and person (i.e., descriptive epidemiology).
6. Consider whether control measures can be implemented now. (Note: control measures should be considered again after more systematic studies are completed.)
7. Develop and test hypotheses.
8. Plan for more systematic studies.
9. Implement, if not already done, and evaluate control and preventive measures.
10. Communicate findings (i.e., summarize investigation for requesting authority and prepare written reports).

During an outbreak investigation, public health departments may use a practice called "contact tracing" to identify and notify people who potentially have been exposed to someone with an infectious disease. Epidemiologists reach out to those potentially exposed to let them know they've been in close contact with an infected person and to provide information and support to help them keep themselves and their loved ones safe.[35]

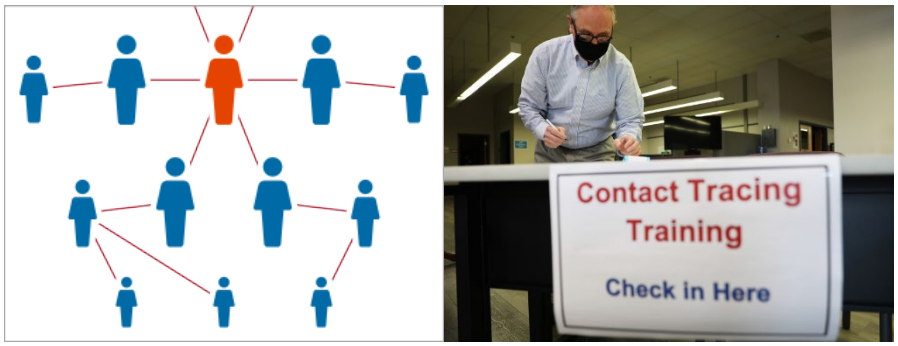

Figure 11: Contact tracing may be complicated and slowed by individuals or populations who have traveled to other states or countries since exposure[36]

By developing strong collaborative relationships, SLTT emergency management personnel and public health personnel can work together during outbreak investigations to support implementation of control measures and communication of necessary information to the public.

[35] California Department of Public Health. (2022, January 5). *What is Contact Tracing?.* https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/COVID-19-Contact-Tracing.aspx

[36] Mackie, B. (2020, May 11). *Delaware National Guard to assist Division of Public Health in fight against COVID-19* [Photograph]. DVIDS Hub. https://www.dvidshub.net/image/6205607/delaware-national-guard-assist-division-public-health-fight-against-covid-19

1.3.3 CHARACTERIZATION IN WATER CONTAMINATION INCIDENTS

In drinking water contamination incidents, identification of the exposure route, the contaminant itself, and the contaminant source play a critical role in reducing the incident's public health impact. Speedy and accurate symptom recognition are critical for supporting efforts to identify contaminated water, develop mitigation measures, and guide the use of appropriate medical countermeasures for humans and animals.

The exposure route may be identified first from a combination of epidemiological investigations, exposure history, clinical diagnosis, and laboratory confirmation. Environmental and laboratory investigations of the potentially contaminated water also will be needed, along with review of the water system to understand any operational lapses. For cases in which adverse health effects occur soon after exposure, the association of symptoms with drinking water may be considered for persons exposed. For cases in which adverse health effects occur well after exposure/ingestion (days later), the association of illness with the public water system may be more difficult to determine and will rely more heavily on public health investigations to determine the source of exposure. Details surrounding the exposure route can provide some insight into the magnitude of avoidable exposures.

Figure 12: Contaminated water system sampling[37]

When a water system is suspected to be compromised, response activities that protect public health sometimes may be initiated before the contaminant itself is confirmed. Examples of protective measures include notifying the public of contamination (such as issuing drinking water advisories), providing alternative water sources, interrupting the public's access to the water system. Although pathogen identification may take time, the agent can be determined through laboratory investigations using clinical data, environmental samples, or contaminated products. (See KPF 3: Control the Spread of Disease for further discussion of implementation of water system controls.)

[37] (Left) Tramble, M. (2022, March 24). *Radford Terrace water sampling* [Photograph]. DVIDS Hub. https://www.dvidshub.net/image/7108127/radford-terrace-water-sampling; (Right) Tramble, M. (2022, March 30). *JBPHH water sampling* [Photograph]. DVIDS Hub. https://www.dvidshub.net/image/7117359/jbphh-water-sampling

1.4 Federal Assistance for Incident Detection and Characterization

While biological agent detection primarily is undertaken by SLTT public health authorities, there are federal resources that can assist in epidemiological investigations.

1.4.1 ASSISTANCE IN DISEASE INVESTIGATIONS

When invited by SLTT jurisdictions, the CDC supports such jurisdictions in performing disease investigations and helps to coordinate a national picture. When requested, CDC provides technical assistance to a SLTT epidemiological investigation, for example, through the use of an Epidemiologic Assistance (Epi-Aid).[38] Epi-Aid is an investigation of urgent public health problems such as disease outbreaks, unexplained illnesses, or natural or man-made disasters. When a public health authority requests assistance from CDC, an Epi-Aid enables rapid, short-term (one to three weeks) technical assistance by Epidemic Intelligence Service officers and other CDC subject matter experts (SMEs), generally provided onsite. The focus of an Epi-Aid investigation is to assist partners in making rapid, practical decisions for actions to prevent and control the public health problem.

Following a One Health approach that recognizes the interconnection between people, animals (domestic and wild), and their shared environment, CDC provides technical expertise in the One Health aspects of zoonotic disease investigations and also supports interagency coordination. In the event an investigation involves a zoonotic disease, CDC will coordinate with USDA APHIS Veterinary Services (VS) and other relevant partners. When responding to zoonotic disease incidents, animal health officials will coordinate with public health officials at both the state (e.g., State Animal Health Official) and federal levels (e.g., Area Veterinarian in Charge, USDA APHIS VS).

Coordination Opportunity

Coordinate with public health authorities to understand how emergency management can support biological agent detection and characterization activities within plans.

Refer To

- CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 12 – Public Health Laboratory Testing and Capability 13 – Public Health Surveillance and Epidemiological Investigation

[38] CDC. (2020, May 13). *Epidemiologic Assistance (Epi-Aids) and Field Investigations*. National Center for Environmental Health (NCEH)/Agency for Toxic Substances and Disease Registry (ATSDR). https://www.cdc.gov/nceh/eis/epi_aid.html

- DHS *National Response Framework* (NRF), Emergency Support Function (ESF) # 10: Oil and Hazardous Materials Response Annex (2016; Refer to Appendix D for more information)
- DHS *National Disaster Recovery Framework* (NDRF), Community Planning and Capacity Building Recovery Support Function (2016; CPCB RSF) for more information on facilitating recovery through community planning
- Appendix 3: Intelligence and Surveillance within the *Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (2017)

What Will You Need To Know?

☐ What federal resources are available to support SLTT response? Who is responsible for contacting them? What resources may they need when they arrive?

1.4.2 SELECT AGENT AWARENESS

The Federal Select Agent Program is jointly comprised of the CDC Division of Select Agents and Toxins and the USDA APHIS Division of Agricultural Select Agents and Toxins. The Federal Select Agent Program oversees the possession, use, and transfer of biological select agents and toxins, which have the potential to pose a severe threat to public, animal or plant health, or to animal or plant products. The program greatly enhances the nation's oversight of the safety and security of select agents by:[39]

- Developing, implementing, and enforcing Select Agent Regulations
- Maintaining a national database
- Inspecting entities that possess, use, or transfer select agents
- Ensuring that all individuals who work with these agents undergo a security risk assessment performed by the FBI Criminal Justice Information Services
- Providing guidance to regulated entities on achieving compliance to the regulations through the development of guidance documents, conducting workshops and webinars
- Investigating any incidents in which non-compliance may have occurred

An awareness of these biological agents with the potential to pose a severe threat to both human and animal health will help SLTT emergency management planners effectively communicate and

[39] CDC & U.S. Department of Agriculture (USDA). (2021). *Federal Select Agent Program*, Division of Select Agents and Toxins [webpage]. Accessed: September 21, 2021. https://www.selectagents.gov/index.htm

collaborate with public health, animal health, and law enforcement partners during both the planning for and response to a biological incident.

Refer To

- CDC/USDA APHIS Federal Select Agent Program website and the Select Agents and Toxins List for more information

1.4.3 CONSIDERATIONS FOR CRIMINAL INVESTIGATIONS

The cause of a biological incident (e.g., intentional, accidental, or naturally occurring) may not be readily apparent, and the possibility that the incident resulted from a criminal act must be considered. While the FBI leads all criminal investigations related to the intentional threat or actual use of a biological agent, the interdisciplinary nature of a biological incident means that criminal investigations will likely occur concurrently with public health investigations. To facilitate this process, the FBI and CDC developed the concept of joint criminal and epidemiological investigations in which law enforcement and public health practitioners share information and draw on the unique expertise of both fields to maximize the effectiveness of characterization and response efforts. When criminal investigations are necessary, special attention will need to be paid to public communications strategies, as the public will likely be more distressed by an incident with intent to harm as well as the potential for follow-on malicious activity. To reassure the public, protect the safety of responders, and take the initial paucity of information into consideration, decision-making and the initiation of response activities should be approached cautiously and continually reviewed. Following an attack, the "unknowns" can quickly accumulate, and access to accurate information will lag significantly.

Figure 13: FBI evidence team at crime scene

Coordination Opportunity

SLTT law enforcement agencies and the FBI will coordinate criminal investigative activities with other appropriate SLTT and federal agencies, such as HHS, DHS, EPA, USDA, and other partners as appropriate.

Local poison control centers, statewide systems, and the National Poison Data System are additional sources of information for agent detection and characterization. Coordinate with your local centers and state systems to understand how data is monitored and analyzed—anomalies, unusual clustering of cases, etc.

Refer To

- FBI-CDC *Joint Criminal and Epidemiological Investigations Handbook* (2018)
- *Terrorism Incident Law Enforcement and Investigation Annex* (2004) to the National Response Plan
- EPA Publications on Homeland Security Research Topics webpage for additional information on sampling and analysis, remediation of biological contamination, and water infrastructure incident response

Action Item

- Check out state, regional, and local plans for incident detection, threat characterization, and coordinated FBI/public health criminal investigation.
- Establish coordinated plans among public health, major healthcare partners, emergency management, and law enforcement.

What Will You Need To Know?

Who will you consult to find out:

- ☐ The typical incubation period for the disease? Disease symptoms? If definitive diagnostic tests are available for this disease?
- ☐ If the pathogen has been modified (e.g., if the pathogen has been modified to be resistant to therapeutics)?
- ☐ What type of PPE is required to minimize the likelihood of contracting or spreading the disease?
- ☐ Are there pre-exposure prophylactics (PrEP) and post-exposure prophylactics (PEP) available?

- ☐ What are the morbidity and mortality rates for this disease?
- ☐ How is the disease transmitted?
  - Via direct contact with contaminated fomites, individuals and/or animals?
  - Via ingestion or inhalation?
  - Via vectors?
- ☐ If the disease is contagious, should decontamination be part of the planning process for shelters and community reception centers?
  - How is that decision made?
  - What is the decontamination process and who participates in the process?
- ☐ Which populations are most vulnerable to exposure and infection?
  - General population or selected segments (e.g., children, elderly, first responders, first receivers)?
  - Animal or human?
- ☐ The source of the outbreak?
- ☐ How persistent the pathogen is in the environment? Is the pathogen susceptible to inactivation (i.e., natural attenuation or decontamination)?
- ☐ If the outbreak is limited to human-to-human transmission or if there is environmental contamination also? If there is environmental contamination, how will you find out the size of the affected area?
- ☐ What types of facilities (e.g., transit systems, schools, office buildings, etc.) and critical infrastructure are located within the affected area?
- ☐ How will you find out if it is a naturally occurring or intentional incident?
- ☐ For a suspected intentional release, how will you know:
  - When and through what means the agent was dispersed?
  - What the meteorological conditions were (e.g., temperature, humidity, wind speed and direction, cloud cover, etc.) at the time of the release?
  - If the dispersion was from a point (e.g., sprayer) or moving source (e.g., airplane)?
- ☐ What do first responders and first receivers need to know about a biological incident (e.g., agent type, special considerations for treatment, PPE use, etc.)?

KPF 2: Communicate with External Partners and the Public

Establishing and maintaining communications during a biological incident are important to: 1) enable coordination of efforts between response and recovery personnel and across multiple agencies, jurisdictions, and levels of authority; and 2) convey important messages to inform the public on key aspects of the incident, including the nature of the threat, what they can do to protect themselves, and what they can expect in terms of community mitigation. During a biological incident, communications should provide timely, accurate information and actionable guidance that are crucial in overcoming the lack of awareness and common misperceptions about the characteristics and risks of pathogens and diseases. Overall, well-planned and well-exercised communications systems, strategies, and messaging are critical to achieving response and recovery goals.

2.1 Communications for a Coordinated Response and Recovery

During a biological incident, multiple agencies will support response and recovery. Maintaining and sharing current and accurate information across all levels of government will be a priority. Coordinated and consistent information sharing will be key to ensuring clear and effective messaging and alignment of the various agencies and stakeholders involved throughout the response and recovery effort.

Public information communications for a biological incident should be focused on the following topics:

- Overall description of the situation, including how the disease or biological agent is spread, and outline of governmental response efforts
- Instructions on safety measures and risk guidance based on vector/dispersion method and pathogen characteristics
- Areas to avoid, movement restrictions, evacuation and/or transportation modifications
- Availability of medical and non-medical countermeasures – What is available? For whom? When? Where?
- Availability of diagnostic tests – What tests are available? For whom? When? Where?
- Locations of supportive care and treatment facilities – What is available? For whom? When? Where?
- Self-decontamination and shelter-in-place messaging

2.1.1 COORDINATION WITH PARTNERS

For any disaster, incidents are largely managed or executed at the closest possible geographical, organizational, and jurisdictional levels. For biological incidents, challenges may quickly be elevated to regional, national, and international levels, depending on the extent of the incident and the corresponding need for increased communication across various stakeholder groups. Biological incident communication stakeholders include SLTT public health agencies, healthcare and EMS, animal health officials, emergency management agencies, law enforcement, civic leaders, environmental safety personnel, laboratories, the private sector, and, in some cases, federal partners in public health, emergency management, and environmental protection (i.e., HHS ASPR and CDC, FEMA, EPA, etc.). Together, these various stakeholders will work to identify response and recovery requirements and develop, coordinate, and communicate biological incident-specific messages for the affected population.

Figure 14: Coordination among a wide range of partners is critical to understanding risks and to identifying appropriate response actions

During the preparedness phase, forming relationships with local biological SMEs (e.g., infectious disease physicians, university researchers, biological safety officers, etc.) who can be called upon to quickly assist in a biological incident response will benefit risk mitigation efforts. The pre-incident development of robust and integrated communications processes and systems will facilitate the cooperation and coordination of response and recovery efforts between and among FSLTT departments and agencies, as well as the private sector and NGOs. Having such processes and systems in place before an incident occurs will help jurisdictions achieve desired response and recovery outcomes when a biological incident does occur.

Leverage Partner Resources to Provide Informed Public Guidance

Given the various uncertainties surrounding many types of biological incidents and the need for prompt action to be taken to save lives and mitigate adverse impacts, all available sources of information and expertise should be leveraged to support effective and timely decision-making. Many resources (e.g., academia, private companies, governmental, etc.) are available to help assess the situation, make predictions on agent behavior and disease transmission, estimate potential consequences, and provide protective action recommendations. A host of planning, decision support/response, and modeling/simulation tools are described in the Planning.

Decision-Support, and Modeling Resources section of this document. For example, atmospheric dispersion modeling can be used to determine what areas, if any, should be subject to appropriate protective action guidance (e.g., evacuate or shelter-in-place) following the release of an airborne pathogen.

2.1.2 COORDINATE WITH PRIVATE SECTOR AND COMMUNITY PARTNERS

Coordinated communication and collaboration between government at all levels and the private sector and other community partners supports effective incident response by integrating private sector capabilities and information into response and recovery plans. The private sector, including major employers, trade and industry associations representing the impacted economy and critical supply chains, public-private partnerships, academia, faith-based organizations, and other stakeholders, can help meet communication needs through established channels. Private sector and community partners often serve as a trusted source of information and can help ensure public health guidance is properly communicated to the communities they serve, their employees, at-risk individuals, etc. Community organizations play an important role in assisting with rapid dissemination of information and themselves are an important *source* of information for public health and emergency management authorities on unmet needs and potential support resources.

Refer To

- HHS CDC *Crisis and Emergency Risk Communication (CERC) Manual* (2014) for a comprehensive introduction to the principles and practical tools of crisis and emergency risk communication. Templates and tools are also available to help craft messages and may be found on the CERC Templates and Tools webpage
- Substance Abuse and Mental Health Services Administration (SAMHSA) *Communicating in a Crisis: Risk Communication Guidelines for Public Officials* (2019) for overarching guidance for public officials involved in disaster and emergency communications.
- DHS *Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (BIA; FIOPS) (2017) for additional information on incident coordination and interagency communication

Coordination Opportunity

- Facilitate coordination/integration between and among governmental agencies, key businesses, healthcare networks, animal health facilities, critical supply chain partners, key first responder agencies, and receiving partner organizations.
- Plan for coordinated incident communications with a wide stakeholder representation. Key stakeholders will: (a) coordinate interagency messages; (b) develop and execute public information plans and strategies; (c) advise response officials of emerging public affairs

issues that could affect the response effort; and (d) monitor and control inaccurate information that could diminish public confidence in the incident response effort.

- Via community meetings, discuss biological incident-specific concerns and questions with people across population segments (audiences). Such meetings are good avenues to gain community input into educational campaign development and will further build relationships and trust. They can also help ensure preparedness messaging strategies meet the community's needs.

Action Item

- Develop procedures for determining who your area's SLTT-level spokesperson(s) should be for various types of biological incidents (e.g., leadership from public health, emergency management, hospitals, healthcare networks, etc.).
- Develop biological incident-specific partner messaging and communication strategies.
- Develop protocols and procedures for ensuring timely communication and situational awareness between responding, receiving, and supporting agencies that are specific to biological incident response (e.g., hospitals, HCCs, etc.).
- Discuss the need for cross-jurisdictional communications support and communications interoperability during response to a biological incident.
- Review existing plans for communications specific to a biological incident with neighboring jurisdictions and state and federal agencies, as appropriate.
- Exercise communications plans with nearby jurisdictions to establish them as trusted agents in an emergency and ensure they know how best to reach people in your community.
- Work with schools and daycare centers to understand the best way to include biological incident preparedness in messaging campaigns.
- Work with epidemiological/public health/biosafety experts to understand how best to communicate the data informing decision-making.
- Practice explaining various biological hazards during exercises and in trainings.

What Will You Need To Know?

- ☐ Which stakeholders in your region should be engaged for biological incident communication planning?
- ☐ What are the coordinated communications protocols for a biological incident with SLTT authorities, private or NGOs, healthcare organizations, public health departments, animal health officials, or other stakeholders?

☐ What communications memoranda of understanding (MOUs)/memoranda of agreement (MOAs) are already in place? Are biological-specific MOUs/MOAs included within these plans?

2.2 Communications for an Informed Public

During a biological incident, effective response and recovery is directly linked to compliance with public health guidance regarding personal protective measures and public perception of access to health and medical interventions. Therefore, public communications must synthesize complex medical and health information to promote public understanding of and compliance with such guidance. In addition to all-hazards communication principles, biological incident communications should:

- Provide actionable guidance to the public, healthcare workers, and first responders/receivers on safe work practices, PPE, and steps the public should take to protect itself
- Anticipate and address the questions, concerns, and differing perspectives of the public, business owners, elected officials, and health officials when communicating public health risks and risk prevention measures
- Anticipate and actively monitor mis- and disinformation in mass media and on social media platforms
- Maintain empathetic and validating two-way communication between decision makers and the public
- Support public awareness of ongoing cleanup activities and ongoing human, animal, and environmental health risks
- Coordinate associated messaging for all the above with stakeholder organizations involved

Figure 15: Public complying with protective measures[40]

[40] (Middle) Moede, B. (2020). *Woman in military shops for groceries while wearing a face mask* [Photograph]. DVIDS Hub. https://d1ldvf68ux039x.cloudfront.net/thumbs/photos/2004/6189389/600x375_q95.jpg

The public will demand authoritative, timely, and accurate information, even in the context of a fluid situation that is still developing. Effective response and recovery communication are fostered by comprehensive and flexible communication plans, strategies, and content developed prior to an incident. Coordinated, accessible messaging and information that adheres to principles of risk communication, even in areas unaffected by the incident, is crucial for combating the public fear and anxiety that often characterizes biological incidents. Remember that public communications during biological incident response may include both human and animal health guidance and will likely be more complex than most emergency messages. Maintaining public trust and compliance with warnings and guidance will continue to be a key objective of communications activities during incident response and recovery due to the unique characteristics of biological incidents and the time needed to identify the causative biological agent in many instances.

2.2.1 PUBLIC INFORMATION FOCUS

Communicating the right message at the right time ensures the public has the necessary information to protect themselves. Message composition should consider the following:

- **Specific** – Provide the public with clear information to understand the risk (e.g., confirmed vs. suspected identity of the biological agent) and how to follow specific public health guidance.
- **Consistent** – Messages should not contain contradictory information, and messaging should be consistent across all communication channels available to the public. Message coordination between public health and emergency management officials as well as other stakeholder organizations should occur prior to information dissemination to the public.
- **Certain** – State what is known and unknown in certain terms (i.e., location of origin of dispersal, etc.). Do not guess or speculate.
- **Clear** – Use common words that can easily be understood and avoid technical terms.
- **Accurate** – Do not overstate or understate the facts or omit important information. For example, be accurate when sharing case rates, and explain how that information was collected. Clearly communicate that guidance will be updated as data, resources, and science change.
- **Accessible** – Craft messages with consideration for people with disabilities (e.g., vision- or hearing-impaired populations) and for non-English speaking individuals.

Message context should also be clear to the audience and accompany the guidance. Understanding the hazard, location, timeframe, source of warning, etc. allows for better understanding of the messaging and subsequently helps to mitigate the impacts of the biological incident. Messages should include the following context:

- **Specific hazard** – What is the biological hazard? What are the potential risks for the community?

- **Location** – Where will the effects occur? Does the incident involve a discrete or wide-area dispersal? Is the location described so those without local knowledge can understand their risk?
- **Timeframe** – When will the effects of the biological incident present themselves? How long will the effects last? Is there time to implement protective actions (e.g., masks, movement restrictions, etc.)?
- **Source of warning** – Who is issuing the warning? Is it an official source with public credibility? Is a SME, such as virologist or scientist, available to facilitate public communication?
- **Magnitude** – A description of the expected effects. How bad is it likely to get? How far and how quickly could the biological agent potentially spread?
- **Likelihood** – The probability of occurrence of the effect. For intentional attacks, what is the likelihood of a secondary attack?
- **Protective behavior** – What protective actions should people take and when? Where/who should (or should not) take the actions (described in clear geospatial, age group, and other everyday terms)? How will the protective actions reduce the biological agent's impact? If evacuation is called for, where should people go and what should they take with them?

Keep messaging language simple and easy to understand to help ensure people take the right protective actions at the right times. For example, what type of mask to wear and when to wear it. People will want to know why an action is protective before they will take that action.

Coordination Opportunity

Enhance the crisis and emergency risk communication framework by conducting cross-disciplinary training on issuing biological incident-specific protective action guidance, including the development of pre-scripted messaging targeted towards all community stakeholders, including the private sector. Ensure all stakeholders, including governmental agencies, key businesses, and healthcare facilities, understand the importance of providing consistent, coordinated, accurate, accessible, timely, and understandable information to the public.

Refer To

- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 4 – Emergency Public Information and Warning and Capability 6 – Information Sharing

- FEMA Center for Domestic Preparedness (CDP) Managing Public Information for All Hazards Incidents course
- HHS *Public Health Emergency Response: A Guide for Leaders and Responders* (2007) is specifically tailored for public officials (e.g., mayors, governors, county executives, emergency managers) and first responders (e.g., police, fire, EMS)
- WHO *Effective Media Communication during Public Health Emergencies* (2005) for more information on communicating effectively during public health emergencies

Action Item

- Develop biological incident-specific, accessible public messaging and communication strategies prior to an incident that extend your existing communications plans.
- Familiarize communications staff with existing pre-scripted biological incident messaging resources.
- Determine possible points of confusion in public health and safety guidance for your community, and draft messages to deconflict.
- Determine a review process for emergency messages that incorporates authorities as well as biological incident-specific stakeholders and SMEs. Utilize exercises or real-world scenarios to practice and refine the review chain. Socialize draft messages with decision makers to gain pre-approval for dissemination.
- Establish a process in collaboration with public health authorities to catalog, categorize, and answer public questions during an emergency. Test the process of using pre-approved and stored messages with stakeholders.
- Hold a tabletop exercise in your jurisdiction that uses locally tailored biological incident emergency planning and communications guidance. Include members of the response community from all levels — decision makers, first responders, public works staff, and communicators — and use this opportunity to see what other questions come up. Some questions may be answered by your plan and your pre-scripted messages; others may inform how your jurisdiction shapes and updates its communications plan.

What Will You Need To Know?

☐ Who will gather and synthesize medical and health information for public guidance and compliance from SLTT, federal, non-governmental, and private sector partners?

- When is that likely to happen based on the established response timeline?
- How will various stakeholders be engaged based on specific biological agent types?
- Which stakeholders will be engaged if the incident is thought to be intentional?

☐ How will information on availability of MCMs be provided to the public? On locations of supportive care and treatment facilities? On instructions on risk and protective measures? On testing site and availability?

2.2.2 PUBLIC INFORMATION DELIVERY

Before an incident, jurisdictions and agencies should identify communication systems for public messaging for use in providing clear, factual, and timely public health and safety guidance. In general, dissemination channels should be agile and immediate and able to handle frequent updates as information changes and becomes available. Information can be disseminated through several means including social media, traditional media, and press conferences.

Figure 16: Public messaging through social media[41]

For incidents involving multiple agencies, incident leadership may establish a Joint Information Center (JIC). The Public Information Officer (PIO) participates in or leads the JIC. The JIC is where personnel with public information responsibilities collaboratively perform essential public information and public affairs functions. Leaders can establish a JIC as a standalone coordination entity, as a component of an EOC, or virtually. Typically, a single JIC is sufficient, but the system is flexible enough to accommodate multiple physical or virtual JICs. For example, multiple JICs may be necessary for a biological incident covering a wide geographic area or multiple jurisdictions.

Plans should include a standard operating procedure that can be easily integrated into existing communication plans for the specific methods and partnership networks that will be used to

[41] (Top) DC Homeland Security & Emergency Management. (2009). [Online image]. https://twitter.com/DC_HSEMA/status/1629661813; (bottom) Chicago OEMC. (2020). [Online image]. https://twitter.com/ChicagoOEMC/status/1241371167388094466

communicate information and protective action directives within the jurisdiction during a biological incident. The methods chosen should be informed by typical community usage of platforms and outlets and communicated to the public during preparedness campaigns so that they know where to receive emergency information. Such an approach will help reduce instances of community members using unreliable sources of information and delaying protective action. Additional considerations should be made for how to reach different at-risk populations, as biological incidents pose varying threats to specific populations (e.g., those who are immunocompromised).

For immediate emergency notification, SLTT communications staff can take advantage of public alerting systems that they may use for other incidents (e.g., FEMA's Integrated Public Alert and Warning System [IPAWS], the Emergency Alert System, etc.). For example, the use of geo-targeted messaging or IPAWS, which has the capability to broadcast an alert message to all cellular phones in a given area as a Wireless Emergency Alert (WEA), can provide evacuation, stay-at-home, or other protection guidance to those in an affected area. The limitations of these systems, including the frequency of messaging and the language options available, should be explored, and mitigation strategies considered in advance.

Additionally, planners should consider how to ensure information delivery during concurrent disasters for their communities. For example, cellular connectivity may be lost for days after a natural disaster such as a hurricane or an earthquake in the same area that is being impacted by a concurrent biological incident.

Coordination Opportunity

Practicing the deployment of geo-targeted, biological incident-specific messages is necessary so that strategies selected can be used effectively during an emergency. Including community groups, school officials, local businesses, and other stakeholders in such practice activities will allow communications staff to receive valuable and trusted feedback before an incident occurs and help tailor the alerting strategy to fit the community's needs.

Refer To

- FEMA Integrated Public Alert and Warning System (IPAWS) webpage for more information on how to access IPAWS; to learn about the criteria for issuing warnings, different message categories, and incident- and hazard-specific names/codes; and to obtain authorization to send alerts
- Federal Communications Commission Wireless Emergency Alerts (WEA) webpage for more information on integration and use of this system

Action Item

- Be familiar with communications capabilities that may be deployed for specific biological incidents (e.g., IPAWS and WEA).
- Ensure your jurisdiction has designated individuals authorized to send WEA messages and exercise deploying targeted WEA messages.
- Talk with local organizations and businesses to encourage participation in immediate notification exercises, especially those that may serve historically marginalized communities or communities with fewer healthcare services available.
- Determine which public-preferred news sources are among top choices for use in your jurisdiction. Collaborate with public health authorities to establish who will be communicating with these sources to ensure news outlets know who they will be receiving information from during a biological incident.
- Include communication capabilities for concurrent disasters in exercise scenarios.

What Will You Need To Know?

☐ How will you contact hard-to-reach populations that are considered "high risk" for contracting a biological agent (transient, those experiencing homelessness, homebound, etc.), if the agent is contagious?

2.3 Strategies for Effective Communications

To have the best chance for success, public communications campaigns for biological incidents must do more than just deliver protective action and other response information to the public. Effective communications throughout all stages of response and recovery should be fostered by the development of comprehensive and flexible communications plans, strategies, and content in collaboration with public health authorities before an incident occurs and by cultivating and maintaining relationships with the public. Effective communications require understanding your audience, conducting pre-incident preparedness campaigns, securing technical assistance, communicating throughout response and recovery, communicating with empathy, and communicating for large-scale, intentional, and/or unattributed incidents.

2.3.1 UNDERSTAND YOUR AUDIENCE

Understanding the cultural background, history, location, primary language, values, accessibility needs, etc. of your community's various "audiences" is key to designing an effective communications

strategy for any crisis or emergency situation.[42] Tools such as community-wide surveys can be used to gain insight into the needs and concerns of specific populations and identify populations that may benefit from different or more specific instructions for biological incidents (e.g., immunocompromised, those experiencing homelessness, historically marginalized populations, etc.). Information collected from such a survey will help public communications staff develop successful whole-community messaging campaigns. Community surveys are also a good place to start building public trust in biological incident planning efforts.

2.3.2 CONDUCT PRE-INCIDENT PREPAREDNESS CAMPAIGNS

The public's familiarity with the basic characteristics of biological incidents and corresponding responses and recovery measures can be enhanced through pre-incident education. Pre-incident education also increases the likelihood that the public will heed critical guidance such as directives to shelter-in-place or maintain social distancing and protect themselves from potential exposures. Preparedness messaging strategies that are action focused help the public feel more in control of an emergency and help them retain information and make better informed decisions about how to keep themselves and their loved ones safe during a biological incident.

2.3.3 SECURE TECHNICAL EXPERTISE

Integrating a public health/epidemiological advisor/SME into the communications team will enable the team to draft plain language messages that clearly and simply explain pathogen-specific risks, clarify the importance of recommended protective actions, and address responder and public concerns about exposures. In addition, some messages are best delivered by scientific experts, and for some platforms and media types, such as live interviews, a technical expert should be in front of a camera. Also, when rumors and mis- and disinformation about the incident appear across social media platforms, advisors can quickly assess questionable messages and assist in drafting messages to counter misinformation and promote official guidance. Public health/epidemiological/veterinary experts may be available from community, state, or national organizations, such as state health or agriculture agencies, to serve as SMEs.

2.3.4 COMMUNICATE THROUGHOUT RESPONSE AND RECOVERY

Early in the response, establish that the incident will likely continue to evolve over time, and messages will be updated to reflect current conditions and new information as it is gathered, such as pathogen identification or changing of protective guidance. Messages that include simple explanations of what work is ongoing and how it affects current and future public/animal health and environmental safety helps the public understand that work is being done hours, days, or even months after the incident. Frequent, regular updates from an official account on social media encourage and enable compliance with public health guidance even when no new information is

[42] CDC. (2014). *Crisis and Emergency Risk Communication, 2014 Edition*. HHS. https://emergency.cdc.gov/cerc/resources/pdf/cerc_2014edition.pdf

available. Additionally, this helps to ensure people will continue to look to official sources for information. Social media platforms should be monitored and analyzed to identify common questions, rumors, concerns, and immediate needs. This information can help inform the structure and content of ongoing response and recovery messaging.

2.3.5 COMMUNICATE WITH EMPATHY

Create validating and empathetic messaging to help sustain the community and maintain its support during difficult times. The public most likely will experience strong emotions due to displacement, perceived speed of response and recovery activities, economic challenges (including potential loss of income), and illness or loss of loved ones. Consideration of the public's fear, grief, and sadness before giving information or instruction reassures the public that their concerns are being heard and taken seriously and increases their trust in the response and recovery process.

2.3.6 COMMUNICATIONS FOR LARGE-SCALE, INTENTIONAL, AND/OR UNATTRIBUTED INCIDENTS

Whether small or large in scope, a biological attack on American soil will almost certainly be a leading topic of worldwide reporting and interest. Even an unintentional biological incident that is large in scale (such as a pandemic) will attract 24-hour, multi-platform, multi-outlet interest and regional, national, and international coverage. More locally, a mass casualty biological incident will likely incite feelings of fear, anger, and grief within the public. In any case, wide reporting by media outlets can be expected in conjunction with a biological incident. Local PIOs and communications teams likely will be immediately overwhelmed by inquiries and will need the support of public affairs staff from neighboring jurisdictions and state and federal agency and private sector partner communications offices. Official communications must always show that everyone's priority is to protect the public and the environment and focus on the actions being taken to do so. Messages must remain clear, concise, and consistent, providing vital information on protective actions without instilling additional fear or causing panic. In the instance of a terrorist incident, the DOJ FBI must be consulted before issuing sensitive media/press releases.

When developing behavioral guidance messaging, communications staff must consider how their messages and the communications techniques and/or social media campaigns being used are perceived by the public at large. Communications should address the questions and concerns of the whole community, including the public, business owners, elected officials, and responders and healthcare workers, and should be easily understandable. When developing messages and communicating public health risks and protective measures, ask the following questions:

- Is the guidance evidence- and risk-based? Will implementing the guidance achieve benefits that outweigh the risks (e.g., loss of jobs, adverse impacts to critical infrastructure)?
- Do the risks and prevention measures complement each other, or do they conflict (e.g., will fully vaccinated persons still be required to wear masks)?

- What questions should we anticipate from people after we communicate the risks and protective measures (e.g., do I still need to wear a mask outdoors when taking a walk)?
- Is the guidance overly technical? Are there numerous "if and then" conditions or caveats that may confuse readers?

Figure 17: Holding town hall–style community meetings and preparing official spokespersons to speak with news media are important communications strategies

Preparedness messaging strategies that focus on action help the public feel more confident in the response, assist them in understanding what's important and what's not, and allow them to make better-informed decisions during an actual incident.

Talking about the people who have succumbed to the disease or agent will be one of the most harrowing aspects of a communicator's job; messages written with compassion, vulnerability, and strength will help the community begin the recovery process and provide some closure and comfort to those who have lost a great deal.

Coordination Opportunity

Encourage local organizations to share existing emergency plans and work together to develop biological incident-specific emergency plans. Encourage the creation of plans for locations where people tend to gather in the community.

Work with local media outlets before an incident occurs to ensure the media understand the key role they play in reinforcing the protective action messages that are important for saving lives during a biological incident.

Refer To

New York City Community Emergency Planning Toolkit is a good model to consult when beginning to design and scope your survey needs

FEMA Emergency Management Institute (EMI) Public Information Officer (PIO) training program, which includes some of the following courses:

- IS0029 Public Information Officer Awareness, for a general understanding of the emergency public information function
- E0105 Public Information Basics, for new FSLTT emergency managers
- E0388 Advanced Public Information Officer, for full-time public information personnel with extensive experience in public information activities
- E0389 Master Public Information Officer, for experienced PIOs who serve in a leadership role during large events requiring communication and collaboration at the state, regional, and federal levels

FEMA CDP training on public information and communications, which include the following courses:

- Managing Public Information for All Hazards Incidents (MPI MGT-902)
- Emergency Communication Methods

UPMC Center for Health Security *How to Steward Medical Countermeasures and Public Trust in an Emergency* (2016) for more information on best practices for communicating risk in an emergency

Action Item

- Discuss the need for pre-incident preparedness as a lifesaving technique for a biological incident with elected officials and community leaders and members.
- Identify successful outreach campaigns within your community and model biological preparedness outreach campaigns on these.
- Explore and exercise the use of digital media monitoring.
- Throughout the planning process and subsequent training and exercise activities, talk with communications staff about the mental strain that will occur during an actual incident and the resources available to provide support.
- Plan for gaps in coverage in staffing during the recovery phase as responders tend to their loved ones and homes in addition to the more specific concerns that may arise if a biological agent is contagious (i.e., quarantine, masking, etc.).
- Establish plans to provide surge support to communications staff within your response structure.
- Consider messaging needs and strategy for incorporation of fatality management as a topic of need. Enlist the support of professionals who regularly communicate about death. Research cultural differences in dealing with death and burial. Discuss the emotional strain of messages related to fatality management with staff who will have to draft them.

- Work with Regional FEMA counterparts to learn how to take advantage of the Crisis Counseling Assistance and Training Program.
- Work with Regional HHS Offices to access HHS programs for your SLTT community.

What Will You Need To Know?

- ☐ What are the demographics of your community? How are communication adaptations for variations in population density, non-traditional groups, non-English speaking groups, or other vulnerable community areas or members accounted for in your biological incident response and recovery plans?
- ☐ What languages are spoken, preferred, and understood in the community?
- ☐ Which local venues have existing emergency plans (for any incident)? Do they have communications plans for large-scale catastrophic incidents?

2.4 Federal Assistance for Communication with External Partners and the Public

The need for mutual support between regional and SLTT partner agencies is likely during a large-scale biological incident. In some instances, a federal Unified Command (UC) may be established to maintain situational awareness; keep track of the ever-changing status of human, critical services, resources, supply chain, and infrastructure impacts; support SLTT resource requests, and communicate with SLTT partners throughout response and recovery.

Biological incidents that have large human health impacts will entail, at a minimum, communications between partner agencies such as HHS ASPR, FEMA, and HHS CDC. A variety of other agencies will be brought in as required by the situation and to provide additional expertise and representation as the UC expands. As an example, DOS will engage with international stakeholders and in the early stages of an overseas incident caused by a novel emerging disease reported under International Health Regulations (IHR), while terrorist incidents will involve the DOJ FBI and the Attorney General will lead law enforcement investigation activities when the incident is, or is suspected to be, intentional in nature. FEMA will help coordinate information and resource requests among federal partners, as necessary.

2.4.1 FEDERAL RESPONSE PARTNERS THAT COMMUNICATE WITH THE PUBLIC

When an incident is complex enough to require a coordinated, interagency communications effort, the federal Emergency Support Function (ESF) #15 will be activated to provide additional coordination mechanisms and resources for the whole responding community, including individuals, community organizations, NGOs, the private sector, and FSLTT governments. When ESF #15 is activated at the federal level, EA efforts are coordinated by the Lead Federal Agency (LFA) and a JIC may be activated to serve as the federal incident communications coordination center.

2.4.2 EMERGENCY SUPPORT FUNCTION (ESF) #15 – NATIONAL RESPONSE FRAMEWORK EXTERNAL AFFAIRS ANNEX

At the national level, ESF #15 and the External Affairs Annex to the NRF integrates the Public Affairs, Congressional Affairs, and Intergovernmental Affairs components of federal departments and agencies. ESF #15 coordinates the development and release of accurate, timely, and accessible federal information and instructions to affected audiences, including the government, media, NGOs, the private sector, and, in coordination with SLTT entities, to the local populace (including children, those with disabilities, vulnerable populations, and individuals with limited English proficiency). Under SLTT-level ESF #15 annex to emergency response plans, SLTT authorities retain primary responsibility for communicating health and safety instructions for their population, although the federal government may assist (for example, HHS and CDC provide a variety of incident-specific information via agency websites and have communication centers that can coordinate the multi-jurisdictional release of public health and medical information). Specific supplemental guidance for HHS, its agencies, and partners to educate and inform the public, healthcare professionals, policy makers, partner organizations, and the media is located in the Public Health and Medical Annex (ESF #8) to the NRF. This also includes content related to:

- Federal assistance to the incident-affected area
- Federal departmental/agency response
- National preparedness activities
- Protective measures (both MCMs and NPIs)
- Impacts on affected and non-affected areas — health and medical impacts, both real and perceived

Figure 18: Communication at the National Response Coordination Center

Activation of National Incident Communications Conference Line (NICCL) may occur along with ESF #15 activation; these calls involve regular updates from key external affairs leadership across the federal government.

2.4.2.1 External Affairs Coordination – Activation of a Joint Information Center

The LFA will use its existing and pre-approved EA structure that coordinates with the White House, federal and SLTT agencies, the private sector, and other entities to provide credible messaging and accurate information to affected populations using all available technologies and tools through their PIO and EA offices. The UCG and/or LFA may elect to establish a JIC (or National JIC, depending on the incident) for biological incidents, including food and agriculture incidents. The JIC performs the following:

- Ensures all potential stakeholders for incident response and recovery efforts are provided the necessary information for release
- Deconflicts all information prior to release and provides a unified public message regarding the status of the incident response and recovery as well as any public, animal, plant, or environmental health impacts that may arise from the incident
- If applicable, interacts with an established Incident Command (IC) or UCG to ensure that all messaging coincides with the ongoing response and recovery operations
- Acts to minimize delays to the release of approved messaging
- Ensures equal access to the information distributed to the public, including the provision of information in alternate formats for persons with disabilities, children, and the elderly, and, as needed, in languages other than English

2.4.3 PUBLIC INFORMATION FEDERAL SPOKESPERSON

Depending on the nature of the biological incident, HHS ASPR may designate one of the HHS agencies (e.g., HHS CDC and FDA, NIH) to lead public health and medical response public affairs activities;[43] alternatively, the appropriate spokesperson may be from DHS, the White House, the National Security Council (NSC), or elsewhere. In the instance of a terrorist incident, the DOJ FBI must be consulted before sensitive media/press releases are issued. Federal response-related announcements to the public typically are coordinated through the JIC. In some cases, federal government officials, in concert with SLTT officials, may need to communicate with the media/public on tactical operations and matters affecting public health and safety directly from the scene, particularly during the early stages of the emergency response in the context of a localized incident.

[43] The President of the United States has directed the Secretary of Homeland Security and the Attorney General to coordinate with each other to execute key responsibilities that provide public information and warning to the nation regarding terrorist threats and attacks.

Figure 19: A FEMA spokesperson communicating a message

Coordination Opportunity

Coordinate with federal public health, communication, emergency management, and other officials to establish who is responsible for communications, especially as incidents increase in scope/scale, and ensure that communications are consistent.

Action Item

- Review federal resources and ensure that your jurisdictional communications meet national standards.

Refer To

- DHS *National Response Framework* (NRF), Emergency Support Function (ESF) # 15: External Affairs Annex (2016)
- HHS CDC *Crisis and Emergency Risk Communication: Terrorism and Bioterrorism Communication Challenges* (2014) for more specific information on communication during bioterrorism incidents

What do you need to know?

- ☐ What federal support is available for communicating with the public? When would this be available to support response or recovery?
- ☐ How will your communication plan for biological incidents expand to include federal stakeholders? How will operations return once federal partners are no longer engaged for communication assistance?

- ☐ What information will federal partners request to ensure informed decision-making and communication?

KPF 3: Control the Spread of Disease

Disease control efforts limit the spread of disease by avoiding unnecessary exposure and preventing the onset of disease in those exposed. By controlling the spread of disease, lives are saved and resources may be used more effectively, thus reducing the overall impact of the incident. Depending on the nature of the incident (e.g., intentional, accidental release, or naturally occurring; transmission via contaminated surfaces or air; and contagious versus non-contagious disease), controlling the spread may involve a combination of NPIs, MCMs, and/or environmental containment/source reduction (e.g., vector control).

3.1 Non-Pharmaceutical Interventions

NPIs are actions that can be taken during a biological incident to slow the spread of disease. NPIs may be used as a stopgap measure to bridge the time between detection of the incident and the arrival of pharmaceuticals, or as the predominant intervention when pharmaceuticals to prevent/treat the disease do not currently exist.

3.1.1 TYPES OF NON-PHARMACEUTICAL INTERVENTIONS

Public health authorities will determine when and which type of NPI measures should be implemented. Depending on the nature of the biological incident, controlling the spread of a pathogen may require personal, community, and/or environmental NPIs.[44]

- Personal NPIs*:* Protective actions that can help individuals avoid exposure to pathogens, such as handwashing, covering of the mouth and nose when coughing and/or sneezing, wearing facemasks/face coverings, and voluntary home isolation for those with confirmed illness or quarantine for those who were exposed but are not yet ill.[45] In general, the use of these measures community-wide is recommended only during biological incidents involving contagious diseases that are of sufficiently large scale and scope. For vector-borne diseases, avoidance of vector habitat areas during peak vector activity times[46] can reduce exposure to vectors and lower the risk of disease transmission.

[44] CDC. (2018, March 9). Application and Integration of Non-pharmaceutical Interventions (NPIs) into Pre-Pandemic Influenza Planning, Preparedness, and Response (Web-based). Training and Continuing Education Online (TCEO). https://tceols.cdc.gov/Course/Detail2/7618

[45] CDC. (2019, August 26). *Personal NPIs: Everyday Preventive Actions*. HHS. https://www.cdc.gov/nonpharmaceutical-interventions/personal/index.html.

[46] USDA Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS). (2014). *FAD PReP NAHEMS Guidelines: Wildlife Management and Vector Control for a Foreign Animal Disease Response in Domestic Livestock*. https://www.aphis.usda.gov/animal_health/emergency_management/downloads/FAD-PReP_NAHEMS_Guidelines.pdf

- **Community NPIs:** Strategies and policies that communities and organizations can implement to minimize the risk of an outbreak negatively impacting Community Lifelines. Most commonly, workplace and public/community environments, procedures, and policies are modified to prevent spread of disease in settings in which close human contact may be necessary. Modifications may include temperature and/or sign/symptom checks, limiting in-person capacities, and facility closures. Protective measures can be supported through:
    - Encouraging staff and public compliance with personal NPIs
    - Eliminating nonessential travel
    - Limiting workplace interactions by implementing telecommuting policies and developing staggered work schedules when feasible
    - Educating the community about proper PPE use[47]
- **Environmental NPIs***:* Engineering controls can be implemented in indoor or outdoor settings to protect community members from exposure. In a workplace setting, engineering controls protect workers from biological hazards by mitigating hazardous conditions and/or by isolating or separating workers in ways that will not interfere with productivity.[48] Examples of engineering controls include increasing air exchange and surface sanitization in addition to high-efficiency air filters; physical barriers such as clear plastic sneeze guards; ultraviolet lighting; drive-through windows for customer service; and specialized negative pressure ventilation in areas where aerosol generation is likely (e.g., airborne infection isolation rooms in healthcare settings, specialized autopsy suites in mortuary settings). [49] Environmental NPIs also include routine surface cleaning of frequently touched surfaces and objects, especially in childcare facilities, schools, workplaces, etc.

[47] Occupational Safety and Health (OSHA). (2020). *Guidance on Preparing Workplaces for COVID-19*. Department of Labor (DOL). https://www.osha.gov/sites/default/files/publications/OSHA3990.pdf

[48] National Institute for Occupational Safety and Health (NIOSH). (2015, January 14). *Engineering Controls*. CDC. https://www.cdc.gov/niosh/engcontrols/; OSHA. (2020). *Guidance on Preparing Workplaces for COVID-19*. DOL. https://www.osha.gov/sites/default/files/publications/OSHA3990.pdf

[49] OSHA. (2020). *Guidance on Preparing Workplaces for COVID-19*. DOL. https://www.osha.gov/sites/default/files/publications/OSHA3990.pdf

Figure 20: Examples of personal, community and environmental NPI measures

In most cases, the authority to mandate isolation and quarantine resides with state and local government public health authorities, although the federal government has the authority to institute isolation or quarantine to prevent the introduction of a communicable disease to the U.S. from a foreign country or the spread of disease between states. Additionally, tribal nations have the authority to enforce their own isolation and quarantine laws. Public health, legal, emergency management, and law enforcement officials should coordinate on implementation and enforcement.

Coordination Opportunity

Coordinate with public health authorities to develop an understanding of how NPI measures may affect the overall response and plan for supporting the implementation of NPI measures throughout the community. Emergency management agencies may serve as a convener of local government agencies and stakeholders to create buy-in (e.g., educational campaigns, pre-planning meetings) regarding the importance and effectiveness of NPI measures in preventing disease spread.

Action Item

- Anticipate types of public health mitigation measures and potential impacts to critical infrastructure and continuity of government and critical government services at the SLTT level; develop and implement NPIs that provide protection for government staff and the public in in-person settings while maintaining critical mission continuity.
- Develop partnerships with local service organizations to support individuals who may face challenges with implementing NPIs, including vulnerable populations such as those experiencing homelessness with limited access to personal hygiene facilities and residents of congregate housing and multi-generational homes that cannot easily self-isolate or quarantine.
- SLTT authorities should consider providing incentives and/or grants to support the implementation of NPIs by smaller entities to prevent disease spread. Smaller businesses

may not have the resources to enact large-scale facility changes or the space to create separation between workers.

- Work with local employers and state and local health officials to develop strategies that employers can use to support worksite flexibility (e.g., telecommuting) and flexible work hours (e.g., staggered shifts) to prevent the spread of disease.
- Ensure first responders, first receivers, and other mission-essential government employees receive training for NPI-related procedures.

Refer To

- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 11 – Nonpharmaceutical Interventions
- HHS CDC NPIs Planning Guidance and Checklists webpage
- HHS CDC online course Application and Integration of Non-pharmaceutical Interventions (NPIs) into Pre-Pandemic Influenza Planning, Preparedness, and Response

What Will You Need To Know?

- ☐ Which government agency in your jurisdiction has the authority to develop, issue, and enforce NPIs? For example, who has the authority to enforce isolation orders and quarantine compliance? Laws may vary by state.
- ☐ How can emergency management work with public health to plan for implementing NPIs throughout the community? With NPI-related communication, public education, and/or situational awareness?
- ☐ How can emergency management assist public health in identifying historically marginalized or underserved communities that may benefit from targeted education or support for implementation of NPIs?
- ☐ How will you support major public and private sector infrastructures in your region in planning for possible impacts of NPI implementation?
- ☐ How will you encourage the owners/operators of amusement and theme parks, sports complexes, convention centers, train and bus stations, airports, and other public spaces to plan to implement NPIs?
- ☐ What planning resources will help them? Which SMEs will they need to know and communicate with?

3.1.2 REPERCUSSIONS AND CHALLENGES OF NON-PHARMACEUTUCAL INTERVENTIONS

While intended to support lifesaving measures in the context of biological incidents, the implementation of NPIs also can have serious repercussions on the community in both the short and long term. For example, school closures can have educational, developmental, behavioral/social, and other health and well-being impacts on children. Isolation, quarantine, and social distancing requirements can have adverse impacts on the mental health of the affected population, who may experience stress and anxiety (see KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population, for further discussion of mental health needs). The transition of schools and businesses to a virtual environment may limit their operations, and the need for reliable broadband internet may preclude rural or poor communities from participating. Limited customer capacities or facility closures will cause financial hardships for businesses and have cascading impacts to employee and customer livelihoods. Travel restrictions (domestic and international), embargos, business restrictions and closures, and cancelation of mass gatherings/events can create further economic hardships for communities and local business owners.

With community buy-in, many personal and community NPIs are relatively easy to implement; however, for the reasons stated above and others, local authorities may experience strong opposition to widespread adherence to NPIs. Achieving widespread and persistent implementation of face mask use and voluntary home isolation can prove difficult, especially if access to supplies of face masks is limited; at-home isolation is difficult to enforce when called for. In fact, community-wide compliance with prophylactic regimens and isolation/quarantine restrictions has been problematic in biological incidents prior to COVID-19.[50] As demonstrated during the COVID-19 pandemic, isolation, quarantine, and stay-at-home orders can create feelings of frustration and anxiety due to the loss of routine and social interaction.[51] These public health strategies, while effective, can also increase risk to persons already experiencing interpersonal violence at home.[52]

[50] Smith, L. E., D'Antoni, D., Jain, V., Pearce, J. M., Weinman, J., & Rubin, G. J. (2016). A systematic review of factors affecting intended and actual adherence with antiviral medication as treatment or prophylaxis in seasonal and pandemic flu. *Influenza and Other Respiratory Viruses 10*(6), 462–478. https://doi.org/10.1111/irv.12406; Rothstein, M. A., & Talbott, M. K. (2007). Encouraging compliance with quarantine: a proposal to provide job security and income replacement. *American Journal of Public Health, 97*(Suppl 1), 49–S56. https://doi.org/10.2105/AJPH.2006.097303

[51] Brooks, S.K., Webster, R.K., Smith, L.E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G.J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *Lancet, 395*(10227), 912–920. https://doi.org/10.1016/S0140-6736(20)30460-8; Masters, N.B., Shih, S.F., Bukoff, A., Akel, K.B., Kobayashi, L.C., et al. (2020) Social distancing in response to the novel coronavirus (COVID-19) in the United States. *PLOS One, 15*(9): e0239025. https://doi.org/10.1371/journal.pone.0239025

[52] Voth Schrag, R.J., Leat, S., Backes, B. et al. (2020). "So many extra safety layers:" Virtual service provision and implementing social distancing in interpersonal violence service agencies during COVID-19. Journal of Family Violence. https://doi.org/10.1007/s10896-021-00350-w

Individuals within communities may be more likely to comply with personal NPIs if they receive information regarding the risks associated with non-compliance from trusted sources (refer to KPF 2: Communicate With External Partners and the Public), and if the NPIs are supported by local medical authorities, religious and community-based organizations, businesses, and government, and coupled with employer encouragement.

The implementation of NPIs such as travel restrictions, school closures, and mandatory home isolation orders can also create ethical and legal concerns. For example, contact tracing combined with home quarantine may raise concerns regarding violations of privacy, equity, and freedom of movement, and infected individuals could become stigmatized. Similarly, school and other facility closures can disproportionately affect low-income families, including those experiencing homelessness, those relying on state or local food programs, people with disabilities, indigenous peoples, and other vulnerable populations.[53] Planners and local authorities will need to balance information on biological incident severity, spread, affected populations, and local response goals with a critical examination of the potential adverse effects of NPI measures.

Coordination Opportunity

Support collaboration between public health authorities, emergency managers, other relevant organizations, and local media to plan and execute engaging educational campaigns for the community on proper implementation of NPIs.

Bring public health authorities, community leaders, local stakeholders, and business owners together to discuss potential economic and social ramifications of NPIs and incorporate these considerations into pre-incident planning.

Action Item

Consider the potential consequences of NPI implementation including civil rights, civil liberties, socio-economic, and financial impacts.

- Work with public health authorities to determine data sources that can help identify appropriate triggers and relaxation indicators for NPIs.
- Conduct thorough reviews of state, regional, and local plans for NPI implementation.

[53] WHO. (2019). *Global Influenza Programme: Non-pharmaceutical public health measures for mitigating the risk and impact of epidemic and pandemic influenza*. https://apps.who.int/iris/bitstream/handle/10665/329438/9789241516839-eng.pdf

What Will You Need To Know?

- ☐ How will you support the communication of NPI guidance to the public?
- ☐ How can emergency management support implementation of NPIs in their respective communities (i.e., beyond messaging)?
- ☐ How long will the various types of NPI measures take to implement?
- ☐ What obstacles could decrease the effectiveness of certain NPI measures? How can these be overcome/planned for?
- ☐ How will planners help address the social and economic impacts that may result from closures and other more restrictive NPIs due to a biological incident?

3.2 Medical Countermeasures

Once the cause of disease is known, MCMs that effectively treat or prevent the disease can be utilized, if available. Effective use of MCMs during a biological incident will not only help reduce the spread of disease but also reduce incidences of illness, thus reducing the burden on healthcare systems; often, MCMs will be paired with NPIs. MCMs include materials used to prevent, mitigate, or treat adverse health effects, such as PrEP/PEP and therapeutics, diagnostic tests, and PPE. MCMs, such as antibiotics, antitoxins, vaccines, and antiviral drugs, can be used to treat patients with disease symptoms or to prevent and/or slow the development of disease in exposed or potentially exposed individuals. Prophylaxis may also be provided to individuals who are at high risk of being exposed during the response (e.g., first responders, human and veterinary healthcare providers, etc.) or those who were exposed but have yet to develop illness symptoms. PPE such as protective clothing (e.g., gloves, gowns, etc.), eye protection (e.g., face shields or goggles), and masks or respiratory protection (e.g., disposable filtering facepiece respirators and positive air purifying respirators) are additional examples of MCMs that may be employed during a biological incident. The type of PPE employed will depend on the characteristics of the biological agent involved (i.e., pathogens transmitted through inhalation versus environmental contact or other exposures).

Figure 21: MCMs can include biologic products, drugs, and devices[54]

3.2.1 ACCESS TO MEDICAL COUNTERMEASURES

State and local caches and hospital supplies can serve as sources of readily deployable MCMs that can be accessed quickly during emergencies. Hospital supplies may be available for immediate use while waiting for the arrival of supplies from other sources, but inventory generally is limited. Hospitals do not typically stock MCMs that are seldomly used (e.g., smallpox vaccines) and rarely have on hand more than a few weeks' supply of an MCM that would be used during the course of normal operations. Therefore, even if an MCM is available in a hospital (e.g., broad spectrum antibiotics), existing supplies alone would be insufficient to treat a surge of patients during a major, prolonged biological incident.

States and localities may maintain their own MCM stockpiles, which may be forward-deployed within or near planned MCM dispensing sites.[55] Depending on the size and scope of a biological incident, the Strategic National Stockpile (SNS), managed by HHS ASPR, may be activated to provide speedy access to additional/alternative MCMs. Achieving efficient delivery of MCMs from storage sites to areas in need and then dispensing them to affected individuals requires carefully and comprehensively designed dispensing plans. Within the SNS, materials may be tracked by local and state public health leaders on the Inventory Management and Tracking System (IMATS). When thousands of people need MCMs quickly, dispensing of SNS and state/local MCM caches, such as vaccines, antibiotics, and PPE, to affected populations will likely occur through Points of Dispensing (PODs), which are pre-identified sites planned to serve the dispensing needs of specific areas or

[54] CDC. (2020). *Medical countermeasures can include biologic products, drugs, and devices* [Online image]. HHS. https://www.cdc.gov/cpr/readiness/mcm-readiness.html

[55] Stroud C., Viswanathan K., Powell T., & Bass, R.R. (Ed.). (2011). *Prepositioning Antibiotics for Anthrax*. National Academies. https://doi.org/10.17226/13218

populations. Considerations for the utilization of PODs during a biological incident are discussed in the callout box that follows.

Figure 22: HHS ASPR's Strategic National Stockpile (SNS) supplies[56]

Points of Dispensing (PODs)

A POD is a community location where state and local agencies dispense MCMs to the public during a public health emergency. A system of PODs should be tailored to the specifics of the event, including the transmissibility of the pathogen, the uncertainty of the population at risk, and contamination caused by the incident, which will influence the location of the PODs and their number, layout, throughput, and extensive staffing needs. Additional considerations include ensuring the safety and security of the POD site, its staff, and the public. For intentional incidents, the threat of a follow-on attack at a POD location should be considered.

Ensuring that the facility temporarily housing the POD can return to its normal use is critical for recovery. This goal can be accomplished by planning for site clean-up, decontamination, and disposal of unused MCMs (or return to the SNS) and un-recoverable equipment. Medical care for staff who may become exposed while performing their duties also must be considered. Readers are directed to section 5.2 Medical Countermeasures Use in Healthcare Facilities for further discussion of closed PODs providing MCMs for hospital staff and patients.

[56] (Right) Strategic National Stockpile Communications Team (2015). [Photograph]. CDC. https://phil.cdc.gov/Details.aspx?pid=22230

Figure 23: Drive-through COVID-19 testing[57]

Coordination Opportunity

Collaborate with public health officials and healthcare HCCs to determine how emergency management personnel, assets, and coordination mechanisms can support MCM dispensing and distribution. Work together to plan for disseminating information on who may need to use MCMs (e.g., testing, vaccines, PPE) with details on when, where, and how the public can access MCMs (e.g., location and hours of testing centers, vaccine clinics, or PPE distribution).

Coordinate with public health officials and HCCs to facilitate POD operations. Coordinate with local private and public entities, NGOs, and Voluntary Organizations Active in Disaster (VOADs) to facilitate staffing needs for PODs.

Coordinate with tribes in your jurisdiction to ensure access to MCMs and resources to support POD operations.

Action Item

- Identify potential supply chain challenges for testing, diagnostic, treatment, and PPE supplies for public health and clinical healthcare. Work to develop contingency plans for shortages and alternative sources of supply and sustainment.
- Ensure that POD plans are flexible to address the variety of biological incidents (including agents that are directly transmissible among people and incidents that cause contamination).

[57] Charles County Maryland. (n.d.). *Healthcare workers assist public in COVID-19 testing drive-through* [Photograph]. https://www.charlescountymd.gov/government/other-agencies/charles-county-department-of-health-covid-19-updates/prevention-precautions/covid-19-testing

- Ensure POD planners and law enforcement collaborate for site planning and assessment as well as to arrange appropriate site security.
- Exercise plans for MCM dispensing via PODs.
- Ensure local POD plans consider decontamination, demobilization, and clean-up of POD sites after distribution activities. Plans should include personnel debriefing and the return of equipment and materials, as appropriate.
- Check the logistics aspects of your state and local MCM plans, including plans for the acceptance, warehousing, and distribution of SNS and other stockpiled resources.
- Ensure local public health authorities are familiar with SNS activation procedures. Check out your local public health department's plans for MCM distribution.
- Work with public health and HCCs to determine what MCMs are available within your state and local caches that can effectively minimize the risk of disease transmission.
- If MCMs are unavailable from government caches, where can they be procured? How reliable will these alternative sources of supply be in the context of biological incidents with widespread regional and/or national impacts?
- During planning, identify emergency protective measures that SLTT jurisdictions may request of FEMA under a Stafford Emergency Declaration (or Major Disaster Declaration).

Refer To

- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 8 – Medical Countermeasure Dispensing and Administration and Capability 9 – Medical Materiel Management and Distribution
- HHS APSR IMATS, which provides a mechanism to track large volumes of MCMs at the local and state level

What Will You Need To Know?

- ☐ How will you coordinate with public health and HCCs to know if there are appropriate MCMs and sufficient supplies of MCMs in your jurisdiction?
- How does the jurisdiction plan to track MCMs supply and burn rate? How will it work with private sector partners to accomplish MCM tracking?
- How does the jurisdiction plan to adjudicate/prioritize resource assistance requests, determining those based on real need versus perceived need?
- What will you do if there is a shortage or appropriate MCMs are unavailable?

- What do state and local caches of MCMs contain, and where are they located? How can these caches be accessed?
- Who will you contact in your region to coordinate distribution of regional resources?
- What are the plans for SNS distribution in your state? In your region/locality?
- ☐ How can emergency management personnel or assets support MCM sites (e.g., PODs, testing centers, or vaccines clinics)?
- ☐ What will be the role of volunteers in PODs, such as Community Emergency Response Teams (CERTs), Medical Reserve Corps, and American Red Cross?
- What sites are designated POD locations in your area?
- Are they accessible to vulnerable populations and underserved communities?
- ☐ How will you coordinate with animal health officials to know if veterinary MCMs are needed and available for household pets and service animals?
- ☐ How will you coordinate with public health, HCCs, and laboratories to know about the status of diagnostic testing capacity for your community?
- If labs are experiencing workforce shortages, supply shortages, or testing turnaround times are delayed, how will you know?

3.2.2 PLAN FOR MEDICAL COUNTERMEASURE CHALLENGES

MCM use in a biological incident is not without challenges. For example, because many MCMs treat or prevent only one disease (such as most vaccines), the identity of the pathogen causing the outbreak must be known before some types of MCMs may be deployed. Additionally, the infectious agent may be intentionally (or, in some cases, naturally) altered to be resistant to available treatments, making the resulting disease more difficult to treat or untreatable with available MCMs. Alternatively, specific MCMs may not be available for the pathogen involved (e.g., a toxin or an emerging agent).

Figure 24: Medial countermeasures (MCMs)[58]

Limited capacity for pathogen-specific diagnostic testing in public health laboratories (state and federal) and in independent, hospital, or academic clinical laboratories can present significant challenges to surge testing during a widescale biological outbreak. Staffing shortages, limited access to supplies, and increased demand for testing can all contribute to increased turnaround times and slower test results. The type of testing sample (e.g., nasal swab or blood test) may require additional considerations for both sample collection and test site set up. Moreover, limitations in the availability and accessibility of community testing sites can hinder public health officials' ability to track local infection trends. These challenges in diagnostic testing can impede efforts to control disease spread and may be exacerbated during major communicable disease outbreaks.

Not all biological incidents will require community-wide testing campaigns to control the spread of disease, such as incidents resulting from contaminated water or incidents involving non-contagious pathogens. When such campaigns are beneficial for controlling disease spread, their effectiveness will depend on the public's willingness and ability to participate in testing. Further, the public's willingness to comply with directives that hinge upon testing results (such as self-isolation or quarantine) will impact efforts to control disease spread. Perceived social stigma and potential threats to employment from positive results also can adversely affect compliance. Failure to provide clear and consistent messaging, coupled with the threat of individual social and economic impacts, can derail community-wide testing campaigns. (Refer to KPF 2: Communicate with External Partners and the Public, for messaging strategies that will promote the public's confidence in the information they receive and their compliance with appropriate directives.)

Coordination Opportunity

Ensure collaboration between public health, emergency management, and HCC partners to engage a whole-of-community effort in developing, testing, and exercising MCM distribution and dispensing plans. Ensure all stakeholders understand the importance of providing

[58] (Left) Food and Drug Administration (FDA). (2021). *Vaccines* [Photograph]. https://www.fda.gov/vaccines-blood-biologics/vaccines; (right) Taylor, R. (2013). *CDC H7N9 diagnostic test kit* [Photograph]. HHS. https://phil.cdc.gov/Details.aspx?pid=15707

consistent, coordinated, accurate, accessible, timely, and comprehensible information to the public.

Action Item

- During biological incident planning, establish processes and procedures for collaboration and coordination between public health, private healthcare, and emergency management officials.
- Exercise plans for MCM dispensing and distribution with public health and HCC partners.

Refer To

- The HHS CDC Current Outbreak List webpage for additional updated information regarding an emerging biological incident

3.3 Environmental Containment and Source Reduction

Controlling the spread of the disease may require measures beyond the prevention of disease spread from person-to-person, and can include treating the environment and/or reducing access to contaminated food, water, and/or non-human reservoirs. Thus, responders will need to understand the biological agent's ability to persist in these environments to identify and adopt effective source control methods.

3.3.1 WATER SYSTEMS

Utility level water sources have strong source water protection, disinfection, filtration, and water quality monitoring processes and procedures. Utilities often can shut off their systems, or portions thereof, immediately after notification of a problem to help limit the spread of contaminants. In addition, drinking water advisories (e.g., Do-Not-Use) can protect the public from illness caused by biological agents within public water systems (refer to KPF 2: Communicate with External Partners and the Public for more information on communicating with the public). In fact, Do-Not-Use orders and alternate or emergency water supplies are a core part of local emergency planning in most areas of the U.S., allowing for the protection of public safety while experts engage in characterizing the biological threat.

Many safeguards in place today for water systems are the result of lessons learned from the contamination of the Milwaukee, Wisconsin water system with *Cryptosporidium* in 1993. The chlorine-tolerant parasite caused the largest documented waterborne disease outbreak in U.S.

history, sickening over 400,000 residents, killing 69 people, and prompting a 10-day boil water advisory that disrupted normal life in the community.[59]

Figure 25: Organisms such as *Cryptosporidium* parasites can be introduced into the intestinal system by unsafe water sources[60]

3.3.2 ENVIRONMENTAL PERSISTENCE

Containing or eliminating the source of the biological incident from the environment may be necessary as some biological agents can persist in the environment and can cause disease at some later time. The persistence of a biological agent in the environment is affected by many factors, including temperature, exposure to ultraviolet light, humidity, and the pH of water and soil. Some pathogens (e.g., plague bacteria) persist for only a short of amount of time, while others pose long-term remediation challenges (e.g., anthrax spores).[61] In addition, environmental contamination may spread if the agent is tracked or distributed to new locations beyond the initial incident site by the movement of vehicles, people, or animals/vectors. Monitoring the ongoing presence and viability of a biological agent within the affected area may be challenging due to differences in biological agent characteristics, sample collection methods required (e.g., for air, water, soil, surfaces, etc.), specific testing availability, and testing laboratory capacity.

3.3.3 WILDLIFE RESERVOIRS

Defining the role played by wildlife in disease transmission of a biological agent, if any, is important for evaluating management options. For some pathogens, wild mammal and bird populations are likely to influence disease transmission in livestock and humans. When wild animal species interact or share an environment with domestic livestock or poultry, humans and agricultural animals can potentially be exposed to a pathogen carried by wildlife. Several approaches can be taken to control

[59] Gradus, Stephen. (2014, January 10). *Milwaukee, 1993: The Largest Documented Waterborne Disease Outbreak in US History*. Water Quality and Health Council. https://waterandhealth.org/safe-drinking-water/drinking-water/milwaukee-1993-largest-documented-waterborne-disease-outbreak-history/

[60] (Left) Ewing, E. (1982). *Cryptosporidium* [Photograph]. CDC. https://phil.cdc.gov/Details.aspx?pid=550

[61] Sinclair, R., Boone, S. A., Greenberg, D., Keim, P., & Gerba, C. P. (2008). Persistence of category A select agents in the environment. *Applied and Environmental Microbiology, 74*(3), 555–563. https://doi.org/10.1128/AEM.02167-07

the spread of disease in animal populations, including the use of vaccines (where available) and NPIs. When a disease reservoir exists or has been created in wild animals, wildlife management and disease control measures may be necessary in some cases to reduce the risk of disease transmission to people, livestock, and/or companion animals. Wildlife containment can be difficult and may involve manipulation of the habitat by the addition of fencing, controlled burns, or changes to available water and vegetation (food). Wildlife populations may be managed by treatment, vaccination, dispersal, selective culling, depopulation, or other interventions altering human behavior and minimizing interaction with wildlife. Wildlife populations are also dynamic, including local and migratory animals that change over time, so ongoing assessment of disease risk is necessary.

Figure 26: Veterinarian performing necropsy on a dead Barbary sheep (*Ammotragus lervia*) to confirm anthrax diagnosis[62]

3.3.4 VECTOR RESERVOIRS

Many diseases that affect humans and animals are spread by vectors such as mosquitoes, fleas, and ticks. Control of vector-borne disease spread can be challenging to achieve as these populations are difficult to contain and may travel large distances.[63] In the U.S., vector control is primarily left to the discretion of county or municipal governments, and public health departments typically take the lead on vector control issues affecting human health. Local governments and mosquito control programs often use a combination of methods to control mosquitoes (integrated vector management)[64] since insecticides and other chemical methods are often an inefficient means of controlling vector populations. Multiple applications are typically needed, improper use may

[62] Kelly, J. (2001). *Investigating an Anthrax epizootic* [Photograph]. https://phil.cdc.gov/Details.aspx?pid=22487

[63] WHO. (2020, March). *Vector-borne diseases* [Fact sheet]. https://www.who.int/news-room/fact-sheets/detail/vector-borne-diseases#:~:text=Vector%2Dborne%20diseases%20account%20for,infection%20transmitted%20by%20Anopheline%20mosquitoes .

[64] CDC. (2021, September 9). *Mosquito Control in a Community*. NCEZID, Division of Vector-Borne Diseases. HHS. https://www.cdc.gov/mosquitoes/mosquito-control/community/index.html

contribute to vector resistance or reduce their effectiveness, and some can be harmful to humans and animals.[65] The timing of insecticide application can also be important for interrupting disease transmission as evidenced by the WNV outbreak, wherein attempts to prevent human cases failed when insecticide applications were delayed.[66]

Figure 27: Examples of vectors include mosquitoes, ticks, and beetles[67]

The public also can take steps to reduce mosquito populations and avoid exposure to ticks. Educational campaigns should be used to encourage the public to engage in source reduction activities that eliminate or remove the habitats that produce the vectors. For mosquitoes, source reduction often means reducing access to standing water where eggs would be laid and hatch; for ticks, it might mean keeping grass mowed.

Coordination Opportunity

Consider collaboration with the following:

- Local public health, environmental health, and water authorities to plan for environmental containment and source reduction during a biological incident
- Natural resources and wildlife management authorities to plan for and implement appropriate disease control procedures for wildlife populations
- Veterinary community to plan for disease prevention and public education efforts surrounding companion animal vaccinations and flea and tick preventive medications

[65] USDA APHIS Veterinary Services (VS). (2014). *FAD PReP NAHEMS Guidelines: Wildlife Management and Vector Control for a Foreign Animal Disease Response in Domestic Livestock*. https://www.aphis.usda.gov/animal_health/emergency_management/downloads/FAD-PReP_NAHEMS_Guidelines.pdf

[66] CDC Division of Vector-Borne Diseases. (2013). *West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control.* (4th ed.). https://www.cdc.gov/westnile/resources/pdfs/wnvGuidelines.pdf

[67] (Left) Ellis, S. (n.d.). *Asian tiger mosquito, adult* [Photograph]. https://www.invasivespeciesinfo.gov/terrestrial/invertebrates/asian-tiger-mosquito; (middle) USDA Forest Service (FS). (n.d.). *Lone star tick* [Photograph]. https://www.fs.usda.gov/visit/know-before-you-go/ticks; (right) USDA. (2016). *Aphthona flava flea beetle feeding on leafy spurge* [Photograph]. https://www.ars.usda.gov/oc/images/photos/mar00/k2602-4

- Local vector control programs to plan for and implement appropriate vector control interventions and public education on vector control

Action Item

- Develop a biological incident emergency water supply plan as a supplement to existing all-hazard emergency plans. Incorporate a strategic drinking water advisory communication plan and alternative water supply plan, including the large-scale procurement and distribution of bottled water, as required.
- Ensure alternative water supply plans are accessible, address the needs of vulnerable populations and socio-economically disadvantaged communities, and include affordability protections.
- Plan and exercise water system emergency procedures with stakeholders to define roles and responsibilities and to practice drinking water advisory communications.
- Planners should familiarize themselves with technical options for environmental containment, and actions that can be taken to prevent contamination spread.

Refer To

- CDC *Drinking Water Advisory Communication Toolbox* (2016) for advisory guidance
- EPA *Planning for an Emergency Drinking Water Supply* (2011) for information on the roles and responsibilities of various levels of government when addressing emergency water supply
- EPA water systems Public Notification Templates for Community and Non-transient Non-community Water Systems templates
- EPA *Full-Scale Decontamination of Bacillus Spores from Drinking Water Infrastructure* (2019) for a description of drinking water infrastructure decontamination
- EPA Water Contaminant Information Tool (WCIT) includes comprehensive information about contaminants that could be introduced into a water system (registration needed)
- CDC Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities
- EPA Contaminant Fate, Transport, and Exposure webpage that provides information on agent persistence and transport in the environment
- United States Animal Health Association and/or the National Association of State Public Health Veterinarians webpages to find information on your state or local public health veterinarians

- HHS CDC One Health and Healthy Pets, Healthy People webpages for information on zoonotic diseases and related One Health issues in livestock, companion animals, and wildlife
- *NAHEMS Guidelines: Wildlife Management and Vector Control for a Foreign Animal Disease Response in Domestic Livestock* (2014) for information on relevant management and disease control measures
- HHS CDC Environmental Health Services Vector Control Resources and the Division of Vector-Borne Diseases webpages for additional information about preventing and controlling diseases spread by mosquitoes, ticks, and fleas, and the Mosquitoes webpage for more information and public communication resources

What Will You Need To Know?

- ☐ Who has authority to shut down contaminated water systems?
- ☐ How is the decision made to issue drinking water advisories and alternate water supply guidance?
- ☐ Are healthcare facilities (including dialysis centers) and sterile reprocessing facilities prepared to address disruptions in potable water services?

3.4 Human, Animal, Equipment, and Site Decontamination

Persistent biological agents may require decontamination. Successful decontamination of sites, equipment, people, and/or animals requires specialized response planning and protocols, trained personnel, personal protection supplies and equipment such as PPE (e.g., masks, gloves, respirators), disinfectants/chemicals (e.g., bleach), and specialized equipment (e.g., tents, handwashing stations).

Site and equipment decontamination procedures will vary based on the nature of the incident since pathogens differ in susceptibility to decontaminant solutions/treatments, some of which are effective only on certain surface types (e.g., porous vs. nonporous). Depending on site characteristics, a variety of decontamination treatments may be used. For example, buildings may be fumigated, vacuumed, sprayed with a bleach solution, washed, scrubbed, or rinsed. In general, equipment will be treated with peroxide, exposed to ultraviolet light, or autoclaved. Decontamination support is further discussed in KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population.

The need for human decontamination in a biological incident is rare since, in many cases, a biological incident may go unnoticed for several days (refer to KPF 1: Detect and Characterize the Threat), during which time contaminated people will have bathed and changed clothes, and the biological agent may have naturally decayed. In natural incidents, decontamination is not useful because quarantine of the exposed is the best measure to prevent spread of disease from one person to another (and the infected person will constantly re-contaminate themselves). However,

when the release event is "announced" (for example, if there is an announced attack or a "white powder incident"), personal decontamination procedures would be initiated. Then, individuals with suspected contamination and/or exposure to a biological agent would be thoroughly rinsed, with clothing and personal items removed for separate decontamination. Success in these efforts requires attention to crowd control, cultural sensitivities around privacy/modesty, the needs of individuals with disabilities, non-ambulatory populations, and other considerations. Following decontamination, individuals should be given information on potential symptoms, advised to monitor themselves, family members, and other acquaintances for these symptoms, and guided to follow-up care, should symptoms develop. Consultations between public health and animal health officials should occur to determine whether companion and service animal decontamination is needed and whether it would follow human decontamination efforts, using similar procedures.

Figure 28: Brentwood postal facility decontamination

3.4.1 PLAN FOR DECONTAMINATION CHALLENGES

Site and equipment decontamination efforts may face challenges associated with the selection of an appropriate decontamination method(s), and the availability of time, materials, and trained personnel needed for the method selected. For some biological agents, contamination could result in long-term or even permanent closure of buildings or public spaces as site decontamination may take an extended period of time.[68] Effective site decontamination relies on environmental sampling to identify the boundaries of contamination. In a biological incident, laboratory results for environmental samples may not be available quickly, especially when laboratory capacities are stretched to perform analysis on clinical samples. Further, testing needs may be complex, as determining the presence of the agent in the site or on equipment is not enough; rather, knowing

[68] U.S. Department of Homeland Security (DHS). (2017). *Biological Incident Annex to the Response and Recovery Federal Interagency Operational Plans*. https://www.fema.gov/sites/default/files/2020-07/fema_incident-annex_biological.pdf

whether any agent present is still infectious is key for understanding remaining risk, and this determination generally requires growth of the agent in culture.

Dedicated hazardous materials (HAZMAT) teams with additional containment and cleanup capabilities can augment the response. In major jurisdictions, these teams will follow quickly on the heels of initial responding units; however, this specialized response capability will vary significantly by jurisdiction.

Management/containment and safe storage of contaminated waste, including wastewater run-off from human, animal, and equipment decontamination activities, will pose additional challenges due to storage limitations and the requirement for processing by specially licensed facilities. Waste management considerations are discussed further in KPF 6: Augment Essential Services to Achieve Recovery Outcomes.

Clearance Goals

Clearance goals are goals or criteria for human, animal, or site cleanup and decontamination that describe the amount of residual contaminant remaining in an area, on an item, or on a person following cleanup activities that is deemed to pose "acceptable" risks to human, animal, and/or environmental health. "Clearance" of a person, area, item, or infrastructure indicates these criteria have been met. Unlike chemical or radiological incidents, where there is some amount of residual material that does not pose a risk to human, animal, and environmental health, in biological incidents, a single, viable pathogen can infect a host and lead to disease. Therefore, the presence of any viable pathogen in an area following a biological incident typically is enough to keep that area closed. In this instance, clearance goals are based on the number or extent of samples that must not contain viable pathogen in order to presume the area is not contaminated. Clearance goals will be set by experts and community leaders, stakeholders, and authorities with this in mind; once set, timely and clear communication of clearance guidelines to the affected community will help reduce public anxiety and improve the effectiveness and efficiency of post-incident response and recovery activities. Even so, limited availability of resources, such as personnel, PPE, and testing and detection equipment, may impact the community's ability to achieve clearance goals.

Refer To

EPA Publications on Homeland Security Research Topics webpage for additional information on decontamination, sampling and analysis, remediation of biological contamination (waste management, water infrastructure incident response, and more), which includes:

- EPA *Personnel Decontamination Line Sprayer Options for Biological Contamination Incident Response* (2020) for information on conducting personnel decontamination
- *A Review of Biological Agent Sampling Methods and Application to a Wide-Area Incident Scenario to Characterize Time and Resource Demands* (2017) and Bio-Response

Operational Testing and Evaluation Project – Phase 1: Decontamination Assessment (2013) that discuss biological incident exercise-based information regarding wide-area sampling plans and how the number of samples taken impacts resource requirements, cost, and time to conduct sampling, analysis, decontamination, and waste generation

National Alliance of State Animal and Agricultural Emergency Programs (NASAAEP) *Emergency Animal Decontamination Best Practices* (2014) for practical information regarding planning, training, and exercising for emergency animal decontamination

HHS ASPR Topic Collection: Veterinary Issues for more information that addresses disaster-related animal issues, including animal decontamination

For issues related to livestock and poultry, refer to DHS *National Food and Agriculture Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (FAIA; FIOPs) (2019)

Coordination Opportunity

Work with public health and environmental health experts, community leaders, and stakeholders to support decision-making processes for biological decontamination activities, including:

- Setting clearance goals specific to biological incident remediation (in terms of the number of negative samples),
- Selecting appropriate environmental remediation options,
- Allocating resources, and
- Determining biological waste management needs.

Establish pre-incident MOAs and MOUs for decontamination resource sharing with neighboring jurisdictions.

Action Item

- Develop a plan for assessing the nature and extent of infrastructure contamination and for cleaning up and/or decontaminating as needed.
- Identify key decision makers and establish coordination processes for key decisions that will need to be made; determine the minimum information needed to make those decisions and potential sources for this information.
- Establish default response actions to use when event-specific information is not available.

What Would You Do?

...when an owner and service animal both require decontamination?

What Will You Need To Know?

- ☐ If contamination is widespread, which aspects of critical infrastructure should be prioritized for decontamination?
- ☐ Who is responsible for setting local clearance goals?
- ☐ How are critical areas for decontamination identified?
- ☐ Who are the local or state agencies with regulatory authority? Who holds local authority for remediating public and/or private buildings?
- ☐ What are the decontamination resources (equipment, personnel, etc.) in your region?
  - What are their capabilities and capacities?
  - Who will you contact?
- ☐ Does your jurisdiction have a HAZMAT team? If so, are they trained for biological incidents?
- ☐ What locations in your community are available and accessible for staging decontamination?
  - What are their capacity/capability limitations? How many stations will you need to service your population?
- ☐ What additional considerations will be required for decontamination of those with disabilities, including those who are non-ambulatory?
- ☐ What veterinary services will you need for animal decontamination?
- ☐ What type of decontamination support can you offer small businesses?
- ☐ What are the legal requirements for biohazardous waste disposal for the involved agent?
- ☐ How will you know if the chemicals used for decontamination affect the environment?
  - Which SMEs, organizations, or agencies will you collaborate with to plan for environmental recovery after decontamination?
- ☐ What local facilities are available for safe storage of decontamination waste/materials?
- ☐ What biohazardous waste disposal facilities are located in your region, including licensed contractors/facilities? Is there an established MOU or MOA?
  - What are their capabilities and capacities?
  - Is sufficient transportation service support available? If not, how/where will you obtain service?
- ☐ How will contaminated remains be handled?

- ☐ What are the laws regarding transportation of select agents in your region? What entities are available to transport select agents in your region?

3.5 Federal Assistance for Controlling the Spread of Disease

During some biological incidents, federal support may be necessary to help control the spread of disease. For MCMs, HHS may support SLTT jurisdictions in several ways. As mentioned above, the SNS, which is managed by HHS ASPR, is composed of pharmaceuticals (e.g., vaccines, antibiotics, etc.), PPE, and medical supplies (e.g., equipment, surgical items, etc.) that may be required to control and/or respond to a public health emergency.[69] SNS resources can be deployed to an incident area following a request from the governor of the affected state. Once delivered, the state is responsible for resource distribution; each state maintains its own distribution plan. When animals are involved in a biological incident, National Veterinary Services can provide vaccines as well as equipment for use in veterinary emergencies, including PPE and euthanasia/decontamination supplies.[70]

HHS ASPR also provides the TRACIE, which was created to meet the information and technical assistance needs of regional ASPR staff, HCCs, healthcare entities, healthcare providers, emergency managers, public health practitioners, and others working in disaster medicine, healthcare system preparedness, and public health emergency preparedness. Technical resources include a self-service collection of disaster medical, healthcare, and public health preparedness materials, searchable by keywords and functional areas.[71]

For environmental containment and decontamination, multiple federal entities may assist SLTT jurisdictions. Under ESF #10 of the NRF, the EPA is responsible for the remediation of land and public infrastructure following a biological contamination incident, including acts of bioterrorism. In addition, specially trained personnel from HHS CDC, DOJ FBI, and other federal agencies are available to support decontamination efforts during biological incident response.

To address wildlife disease and vector reservoirs, USDA APHIS works in close collaboration, communication, and coordination with the U.S. DOI and other FSLTT agencies that have primary

[69] Assistant Secretary for Preparedness and Response (ASPR) Technical Resources, Assistance Center, and Information Exchange (TRACIE). (2022, February 14). *Topic Collection: Mass Distribution and Dispensing of Medical Countermeasures.* https://asprtracie.hhs.gov/technical-resources/67/mass-distribution-and-dispensing-of-medical-countermeasures/0

[70] USDA APHIS Veterinary Services (VS). (2021, April 20). *National Veterinary Stockpile (NVS).* https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/emergency-management/nvs/CT_Nvs

[71] Assistant Secretary for Preparedness and Response, Technical Resources, Assistance Center, and Information Exchange (TRACIE). (2022, February 14). *Welcome to ASPR TRACIE.* https://asprtracie.hhs.gov/

jurisdictional authority and subject matter expertise for wildlife.[72] In wildlife disease incidents that may affect public health, USDA APHIS and DOI collaborate with FSLTT public health agencies. HHS CDC helps track human cases of vector-borne diseases.[73] In vector-borne agricultural disease incidents that also involve public health, USDA APHIS collaborates with HHS CDC.[74]

Figure 29: Coordination between SLTT partners during a public health emergency[75]

Refer To

- Strategic National Stockpile webpage for information regarding contents and access
- Public Readiness and Emergency Preparedness (PREP) Act for information on the legal liability surrounding MCM distribution as well as declarations made by the HHS Secretary to provide immunity from tort liability related to MCM distribution
- HHS ASPR TRACIE Topic Collection: Mass Distribution and Dispensing of Medical Countermeasures for a host of resources describing lessons learned, plans, tools, and courses for MCM administration and distribution, including POD-specific information
- DHS *National Response Framework* (NRF), Emergency Support Function #10: Oil and Hazardous Materials Response Annex (2016) for coordination of actions to prevent, mitigate, stabilize (prevent spread), and/or clean up releases, and efforts to develop recommendations for public protective actions

[72] USDA APHIS Veterinary Services (VS). (2014). *FAD PReP NAHEMS Guidelines: Wildlife Management and Vector Control for a Foreign Animal Disease Response in Domestic Livestock*. https://www.aphis.usda.gov/animal_health/emergency_management/downloads/FAD-PReP_NAHEMS_Guidelines.pdf

[73] CDC. (2022, February 11). *Division of Vector-Borne Diseases.* HHS. https://www.cdc.gov/ncezid/dvbd/index.html

[74] USDA APHIS Veterinary Services (VS). (2014). *FAD PReP NAHEMS Guidelines: Wildlife Management and Vector Control for a Foreign Animal Disease Response in Domestic Livestock*. https://www.aphis.usda.gov/animal_health/emergency_management/downloads/FAD-PReP_NAHEMS_Guidelines.pdf

[75] CDC. (2021, January 25). *SLTT partners coordinate during a public health emergency* [Photograph]. HHS. https://www.cdc.gov/cpr/readiness/capabilities.htm

KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population

When mass care services are required during a biological incident, specific infection prevention procedures and protocols may need to be followed if the agent is transmissible from person-to-person. Most biological incidents will not require mass care services of the type and/or on the scale that may be needed in the context of other major disasters such as wildfires or hurricanes. Typically, mass care provides life-sustaining support to disaster-affected populations and comprises seven principal activities. These are: sheltering; feeding; distribution of emergency supplies; support for individuals with disabilities and others with access and functional needs; reunification services for adults and children; support for household pets, service animals, and assistance animals; and mass evacuee support. Affected communities are also likely to face mental health challenges during and following a biological incident. Within this KPF, mass care services are discussed in terms of shelter-in-place or restricted movement scenarios, feeding operations during larger-scale/longer duration non-evacuation scenarios, evacuation and post-evacuation scenarios, and public fear and mental health impacts. Innovative and creative mass care services may be needed to facilitate the distribution of emergency supplies and assistance and support the whole community during the response. For complex, large-scale biological incidents, mass care approaches (including capacities, equipment requirements, and management of vulnerable populations) may require significant operational adjustments.

4.1 Mass Care Considerations for Shelter-In-Place or Restricted Movement Scenarios

4.1.1 SHELTERING-IN-PLACE, NON-CONGREGATE SHELTERING, MOBILITY RESTRICTIONS, AND WIDESPREAD VENUE CLOSURES

A natural, accidental, or intentional outbreak of a highly contagious disease could result in a community being asked to shelter-in-place[76] (e.g., "stay at home") based on a public health order. A large, outdoor attack could result in individuals in the affected area being advised to shelter-in-place at a specific location or within their homes for a short period of time to prevent them from being exposed to the biological agent and to protect them from a potential secondary attack. (Refer to KPF 3: Control the Spread of Disease, for additional information on these protective actions.)

[76] FEMA defines shelter-in-place as the use of a structure to temporarily separate individuals from a hazard or threat. Sheltering-in-place is the primary protective action in many cases. Often it is safer for individuals to shelter-in-place than to try to evacuate. Sheltering-in-place is appropriate when conditions necessitate that individuals seek protection in their home, place of employment, or other location when disaster strikes. More information can be found in FEMA's *Planning Considerations: Evacuation and Shelter-In-Place* (2019).

An epidemic or pandemic caused by a highly transmissible agent may result in the closure of schools, businesses, and other public venues. Additional NPIs may also be advised, and sheltering-in-place could be necessary for an extended length of time. Shelter-in-place plans should include the whole community, with specialized considerations for vulnerable populations and those requiring access to essential medical services (i.e., dialysis, methadone, etc.) and/or medical supplies and other life-sustaining care. Existing all-hazards plans for sheltering-in-place may not be sufficient during a biological incident due to the potential need for specific infection control measures (e.g., PrEP, hand hygiene, wearing PPE, social distancing, disinfecting surfaces and spaces, etc.) to minimize the risk of pathogen transmission between responders and sheltered populations during the provision of mass care services. Biological incident plans also must account for the possibility of workforce shortages (e.g., significant numbers of staff and volunteers ill or quarantined and unable to participate in provision of mass care services) and traditional community mass care services being stretched to capacity. Planners should work with public health authorities, HCCs, and other appropriate partners to adapt mass care plans to meet the needs of sheltered populations, including routine feeding, prescription refills, coordination of transportation to medical appointments, access to veterinary services, etc. based on the biological incident environment.

In addition to sheltering-in-place, non-congregate sheltering (e.g., the use of hotels, public venues, private property, etc.) of certain populations may be necessary during a biological incident to protect public health and save lives. Examples of potential targeted populations include those who test positive and do not require hospitalization but should be isolated (including those exiting from hospitals); those who have been exposed but do not require hospitalization; and asymptomatic high-risk individuals subject to social distancing protocols as a precautionary measure.

Plans for sheltering-in-place and non-congregate sheltering should incorporate considerations for meeting the basic needs of the community affected, such as ensuring access to adequate food and water supplies for all, again including vulnerable populations and pets and service animals. All these needs will become more acute the longer sheltering-in-place, non-congregate sheltering, and/or venue closures extend; additional challenges will arise if business closures lead to loss of income for individuals or households.

Refer To

DHS *Planning Considerations: Evacuation and Shelter-in-Place, Guidance for State, Local, Tribal, and Territorial Partners* (2019) for critical considerations on accommodating vulnerable populations in shelters

Coordination Opportunity

Coordinate with community public health authorities, HCCs, and professionals such as social workers who are experienced in working with vulnerable populations to help develop plans that will meet the needs of all sheltered-in-place persons during a biological incident.

Coordinate with hospitality industry to plan for feeding, sheltering, and hosting distribution sites.

Action Item

- Become familiar with state, regional, and local plans for mass care and human services specific to biological incidents, as well as plans for animal services.
- Determine resources and requirements for mass care and human services needed for biological incident response and recovery.
- Establish mechanisms to ensure efficient and effective delivery of all needed services. Confirm voluntary and NGO partners have biological incident plans and determine their availability to support human services needs during a biological incident, including considerations for the disabled and other vulnerable populations.
- Plan for variation in scope based on biological agent and duration of sheltering-in-place and non-congregate sheltering conditions.
- Plan for special scenarios such as transporting and housing service animals accompanying people who require quarantine or isolation due to the nature of a specific biological incident. If it's unsafe for the service animal and its owner to interact while the person is in quarantine or isolation (e.g., possibility of disease transmission across species), arrangements must be made for the person to receive the service typically provided by the animal in another way, and arrangements must be made for the animal while the person is quarantined or isolated.

What Will You Need To Know?

- ☐ How will you adapt existing shelter-in-place and non-congregate shelter plans for the biological incident environment?
- How will you keep responders and impacted populations safe and minimize the risk of disease transmission during the provision of mass care services?
- Who will you collaborate with to implement pathogen-specific infection prevention and control measures in the context of mass care?
- How would a shortage of available first responders or mass care volunteer workers impact the feasibility of your plan?

- ☐ Who will you coordinate with to understand possible disease risks associated with household pets and service animals?
- Who can provide guidance on whether a pet can transmit the pathogen to a human or a human can transmit the pathogen to a pet?
- How will you support mass care services for household pets and service animals in a safe manner for responders, survivors, and the animals?
- ☐ What accommodations will be made for individuals in need of additional assistance in the context of a biological incident?
- How will underserved populations, those with disabilities, populations living in institutional settings, older populations, children, those experiencing homelessness, populations with limited English proficiency, transient populations (tourists, students, hospitality workers), populations with mobility or transportation challenges, among others, be accommodated?
- ☐ Which aspects of mass care will your jurisdiction be able to provide to owners and their pets at the same time? How will you provide mass care services for pets?
- ☐ What accommodations will be made for service animals (e.g., pet food, medications) that shall be treated as required by law (e.g., the Americans with Disabilities Act of 1990)?

4.2 Mass Care Considerations for Feeding Operations During Larger-Scale/Longer-Duration Scenarios (Non-Evacuation Scenarios)

4.2.1 PROVIDING FOOD AND WATER

During large-scale or longer-duration biological incidents, critical disruption in food supply chains may create challenges in obtaining food and water. Impacted populations, including those who are non-ambulatory and those that remain mobile but are under social distancing restrictions, may require sustained feeding and hydration support if normal access to food retailers is restricted or eliminated or there is limited supply, particularly in major urban areas. The provision of food and water to those in need may also be necessary in instances where families find themselves in an adverse financial situation based on the economic impacts of a sustained biological incident (e.g., job loss, price inflation, etc.). Depending on the level of risk, this may result in a need for mass dispensing sites and/or home delivery for individuals who are mobility challenged or cannot leave their locations based on their personal health status. Examples of supportive actions include:

- Purchasing, packaging, and/or preparing meals
- Delivering food to distribution points and/or individuals, when conditions constitute a level of severity such that food is not easily accessible for purchase or affordable

Figure 30: Public health measures may create supply chain interruptions impacting feeding[77]

The traditional model of using mostly volunteers for the preparation and distribution of food to at-risk populations (e.g., parents of infants) may not be sustainable during a biological incident and, therefore, may require a mix of public-private collaboration and contracting.

In addition to food, access to clean water must be maintained for all affected populations. If a biological incident compromises a community's water supply (e.g., *Cryptosporidium* or Legionnaires' disease outbreak), mass care services may be required to provide individuals with potable water until the source is decontaminated and safe for drinking again. (Refer to KPF 3: Control the Spread of Disease, for more information on environmental containment and source reduction.)

Refer To

- USDA Food and Nutrition Service (FNS) *USDA Foods Program Disaster Manual* (2014)
- FEMA *Mass Care/Emergency Assistance Pandemic Planning Considerations* (2020) Appendix B

Coordination Opportunity

Partner with the private sector, food banks, NGOs, VOADs, and/or National Guard to provide hot, nutritious meals to individuals with restricted mobility, those who cannot access traditional sources of food supplies, or those who have been financially impacted by a biological incident.

[77] Mpi34/MediaPunch/IPX/AP. (2022). *A view of empty shelves at a local Giant supermarket on January 9, 2022 in Alexandria, Virginia* [Photograph]. https://www.cnn.com/2022/01/11/business-food/grocery-store-shelves-empty/index.html

Coordinate with public health and water authorities to understand any biological incident affecting the local water supply, consistently message updates to the community, and provide clean water to any individuals in need.

Action Item

- Ensure adequate feeding plans are in place and coordinated based on the specifics of the biological incident environment, including consideration of contractual agreements and federal funds (if required), in accordance with federal procurement standards. Identify alternate options for maintaining delivery capabilities.
- Develop plans to establish feeding operations to meet the needs of the whole community. Establish agreements with local food services to adapt and expand services to meet changing needs. Ensure mass care feeding plans consider dietary restrictions (i.e., low sodium, gluten intolerance, etc.).
- Coordinate with NGOs and VOADs to determine services and agreements for aid during a biological incident, potentially through implementation of a tool like the Multi-Agency Feeding Plan Template from National VOAD.
- Consider coordination between meal preparation and delivery services, such as Meals on Wheels and local school systems.

What Will You Need To Know?

- ☐ How will you identify best practices for large-scale food dispensing centers and coordinate plans for mass food and water pickup at specially established food dispensing locations?
- ☐ What accommodations need to be made for delivering/dispensing food to those with dietary restrictions during a biological incident?
- ☐ What will be needed to ensure safety of those delivering food or water assistance to impacted populations?

4.3 Mass Care Considerations for Evacuation and Post-Evacuation Scenarios

Certain types of biological incidents may call for the evacuation of one or more elements of the affected population. An incident involving the large-scale dispersion of a biological agent that can persist in the environment, potentially as the result of an attack or an accidental release, could result in the need for people in the affected area to evacuate the impacted structure or area (see KPF 3: Control the Spread of Disease, for further discussion of evacuation and sheltering). If homes have been contaminated with a persistent biological agent, expanded mass care services (e.g., temporary housing) may need to be provided for the affected population. Lingering contamination or exposure concerns following these types of biological incidents may delay recovery activities or extend

recovery timelines, potentially prolonging survivors' needs for mass care and human services for weeks to months to years.

Evacuation may also be caused by another type of disaster, happening concurrently with a biological incident, such as a hurricane, flood, wildfire, or series of major tornadoes impacting an area already facing an epidemic. These types of concurrent disaster events may result in significant needs for adapted mass care services. Natural disasters can result in major evacuation and/or sheltering of populations, and a concurrent biological incident may pose threats to traditional feeding and sheltering activities. Conventional procedures for assisting disaster survivors and providing mass care services may need to be modified to prevent disease transmission among survivors and service providers.

Figure 31: Concurrent disaster events and epidemics may complicate sheltering and evacuation[78]

In both cases, the transmissibility of the pathogen involved may constrain the ability to provide mass care and emergency assistance to survivors. If sheltering is required, congregate sheltering may be suboptimal during an outbreak of infectious disease. This depends on whether the pathogen is transmissible from person to person or is only able to be transmitted from environmental source to person. If the agent is not transmissible between people, traditional congregate sheltering may be an option. If the agent is transmissible between people, alternative options such as non-congregate sheltering may be more appropriate.

4.3.1 EVACUATION AND SHELTERING

The type, scope, and scale of the incident will influence the facilities and transportation services needed to support evacuation and sheltering needs. In addition to routine disaster response

[78] Roberts, K. (2020, December 24). *Camp Pendleton commanding general speaks to community affected by fire* [Photograph]. https://www.dvidshub.net/image/6467367/camp-pendleton-commanding-general-speaks-community-affected-fire

planning, planners should consider these additional questions when planning for evacuation and sheltering during a biological incident:

- With whom will you coordinate to understand public health requirements and orders for evacuees in the destination jurisdiction? Who is your contact at the public health agency?
- How will you know if there are travel restrictions in place that will limit the movement of the impacted population?
- How will you know if evacuees are required to be tested prior to arriving in another jurisdiction?
- How will you know if evacuated populations are required to quarantine or isolate?

As noted above, congregate sheltering may be suboptimal during an outbreak of contagious disease. Adherence to infection control protocols such as social distancing and enhanced cleaning and disinfecting would require congregate shelters to drastically adjust their operating procedures for both staff and shelter residents. Contact tracing, decontamination, and separating those who are infected from those who are uninfected may also be necessary and would increase burdens on staff and shelter residents. Shelters may need to provide PPE to reduce the spread of infection among evacuees, and workforce shortages may occur if staff become exposed or ill themselves.

As a result of these challenges, non-congregate shelters such as hotels, colleges, and universities may be more feasible for sheltering survivors during a biological incident involving a contagious disease, as they provide greater opportunity to separate individuals while providing needed mass care services. Additional subject matter expertise and surveillance/monitoring data may need to be consulted to identify areas and facilities where mass care services can be safely located. In addition, the transmissibility of the pathogen also should be considered when planning feeding operations for any type of sheltering during a biological incident.

Planners should recognize that some underserved populations, such as individuals at lower socio-economic levels, non-documented residents, unhoused individuals, and persons with disabilities or limited mobility, may experience disproportionate impacts from biological incidents. These and other individuals may have limited financial reserves and their income may be disrupted in the aftermath of the incident and/or during response and recovery activities.

Refer To

- FEMA *COVID-19 Pandemic Operational Guidance for the 2020 Hurricane Season* (2020) and *COVID-19 Pandemic Operational Guidance* (2021) for guidance on the safe operation of shelters during a contagious disease outbreak
- HHS CDC Interim Guidance for General Population Disaster Shelters During the COVID-19 Pandemic webpage

- DHS *Planning Considerations: Evacuation and Shelter-in-Place, Guidance for State, Local, Tribal, and Territorial Partners* (2019) for critical considerations on accommodating vulnerable populations in shelters

Coordination Opportunity

Coordinate with community public health authorities, HCCs, and professionals such as social workers who are experienced in working with vulnerable populations to help develop plans that reflect the unique circumstances of a biological incident environment and that will meet the needs of all persons recommended to evacuate and/or shelter, including those experiencing homelessness; individuals with service animals or pets, disabilities, mobility limitations, or medical needs; children; the elderly; etc.

FEMA and the American Red Cross have assembled "Pandemic Sheltering Kits" that provide protective measures such as sanitation stations, privacy walls, and gloves so that shelters can operate safely during a biological incident. Contact the American Red Cross for assistance in obtaining or building "Pandemic Sheltering Kits" to help ensure shelters operate safely.

Action Item

Determine the feasibility of establishing shelters (congregate or non-congregate) and identify what services your jurisdiction will provide during a biological incident and concurrent other disaster. Establish agreements with appropriate facilities in your region to serve as shelters (e.g., hotels, colleges, universities).

Pre-designate shelters (especially non-congregate sheltering locations) and human services center location(s). If multiple, ensure all support locations are linked to facilitate communication, to share information (including tracking of patients and resources), and to maintain situational awareness.

- Ensure sites are made known to local hospitals, emergency medical service providers, law enforcement, and emergency relief services/partners.
- Coordinate with local public health and HCCs to ensure their operational plans are interfaced with the community response plans.

Determine safety measures for protecting against the spread of infection among evacuees within shelters and during transportation.

Plan for workforce and other resource needs, including shortages of staff and PPE during public health emergencies.

Identify methods to coordinate service delivery that maximizes the use of a virtual workforce.

What Will You Need To Know?

- ☐ How will transportation services to/from shelters limit disease spread?
- ☐ What purposes will shelters fill during a biological incident and concurrent other type of disaster (e.g. hurricane, wildfire)? What are the corresponding best practices?
  - Contamination/health screening?
  - Decontamination?
  - Limited medical evaluation and care?
  - Emergency first aid?
  - Temporary housing?
  - Disaster welfare information?
  - Food service?
  - Health and mental health services?
  - Ongoing health surveillance?
- ☐ What facilities in your region are available to serve as shelters during a biological incident and concurrent other disaster?
  - What are their capacities?
  - How will they limit disease spread?
  - How will you handle a shortage of shelters or adequate space?
  - How will you know if there are any staffing or resource constraints?
  - How will you address workforce shortages at shelters if staff are unable to report during a biological incident?
- ☐ What accommodations will be made for individuals in need of additional response assistance?
  - How will populations with disabilities, populations living in institutional settings, older populations, children, those experiencing homelessness, populations with limited English proficiency, transient populations (tourists, students, hospitality workers), populations with mobility or transportation challenges, and populations in need of crisis counseling or mental health services, among others, be accommodated?
- ☐ Which NGO, VOAD, and/or private sector partners will provide sheltering?
- ☐ What process will you use for prioritizing who will be sheltered in non-congregate shelters when such facilities are limited?
- ☐ What mental health services are available to those sheltering?

4.4 Service Animals and Household Pets

Household pets and service animals present complexities in managing all-hazards disasters, including biological incidents. In past disasters, pet owners have chosen not to comply with recommended evacuation if accommodations for their pets could not be guaranteed, which increased risks to life safety for evacuees, responders, and animals. To promote human safety in disaster situations, the Pets Evacuation and Transportation Standards (PETS) Act of 2006 was passed. The PETS Act requires state and local planners to plan for the mass care of household pets and service animals during mass sheltering and evacuation operations, including provision of veterinary care.

During a biological incident, household pets and service animals present even greater complexities. In addition to considerations laid out in the PETS Act, emergency managers must also consider planning scenarios in which the pathogen causing the biological incident may be transmissible from animal to person, from animal to animal, and/or from person to animal.

Refer To

- HHS ASPR TRACIE Topic Collection: Veterinary Issues for more information on disaster-related animal health resources
- HHS CDC Pet Safety in Emergencies webpage, including dog and cat Pet Disaster Checklists
- Ready.gov Prepare Your Pets for Disasters webpage
- NASAAEP Best Practice Working Groups webpage for documents, published in conjunction with USDA, describing best practices for animal transportation, evacuation, sheltering, decontamination, and care
- NASAAEP *Animal Evacuation and Transportation Best Practices* (2012)
- NASAAEP *Emergency Animal Sheltering Best Practices* (2014)

Coordination Opportunity

Coordinate and establish partnerships with public health, SLTT animal health officials, and veterinarians to comprehensively plan for incidents involving animals. Collaborate with animal health professionals to determine where veterinary care should be integrated into other response activities (e.g., sheltering or decontamination) and develop protocols to prevent the spread of infection from animals to people, between animals, and from people to animals in all settings in which disaster veterinary care will take place.

Consult with USDA APHIS to obtain information related to training materials, financial resources, supplemental staffing, and technical assistance for animal needs during disasters.

Action Item

- Ensure plans for animal evacuation, transport, shelter, decontamination, and care are comprehensive and outline operations in accordance with applicable laws.
- Determine your jurisdiction's capacity to shelter owners and their pets together, or if owners and pets would need to be sheltered separately.
- Develop infection prevention and control strategies for any sheltering situation housing pets and service animals alongside people during a biological incident.

What Will You Need To Know?

- ☐ How many pets and service animals reside within your jurisdiction?
- ☐ What protective actions will your jurisdiction take for responders and the public when providing mass care to humans and animals during a zoonotic incident?

4.5 Community Reception Centers

When the incident is the result of a biological attack or accident at a particular site, there may be a need to set up one or more Community Reception Centers (CRCs) to address the mass care needs of incident survivors and their family members, as well as the community at large, and to act as hubs for information sharing. In such instances, establishing a CRC(s) as soon as possible during the incident is critical to meeting the needs of survivors and their families quickly. As with any intentional incident, planners should be aware that places which hold mass gatherings following the incident may become targets for a secondary attack, including hospitals and reception centers.

Depending on the biological agent involved in the incident, CRC operations may need to be modified with various infection prevention and control measures as discussed earlier in this section for evacuation and sheltering. When the biological agent is contagious, CRCs are most likely to become virtual through call centers or hotlines to reduce the threat to those providing services as well as reduce the spread. While feeding operations would typically occur at CRCs, the transmissibility of the biological agent should be considered prior to initiating feeding operations at CRCs after an intentional attack or accidental release.

Figure 32: Community reception centers handling care needs

Refer To

- HHS ASPR TRACIE *Tips for Healthcare Facilities: Assisting Families and Loved Ones after a Mass Casualty Incident*
- FBI-National Transportation Safety Board (NTSB) *Mass Fatality Incident Family Assistance Operations: Recommended Strategies for Local and State Agencies* (2013) for information about different types of reception centers and considerations for their establishment

Coordination Opportunity

Establish relationships with local and regional mass care and human services providers to build familiarity with available services and to help ensure integrated operations during a disaster. Discuss operational adjustments to the provision of basic needs in all-hazards disasters that may be necessary in a biological incident. Establish mechanisms to ensure mass care and human services are efficiently and effectively supplied.

Action Item

- See Action Items above for evacuation and sheltering. Many also apply to CRCs.
- Develop plans for the rapid establishment of call centers to meet immediate needs of survivors and their families following a large, outdoor attack or accidental release.
- Establish plans for protecting survivors and responders from a secondary attack at places that hold large crowds or other areas of concern in the event of an intentional incident.

What Will You Need To Know?

☐ See What Will You Need To Know? section above for evacuation and sheltering. Many also apply to CRCs.

- ☐ What are the reunification plans of daycare centers, schools, businesses, and other organizations in your area?

4.6 Decontamination Support

For biological incidents linked to a discrete location, decontamination of all affected individuals at the primary incident location may not be possible even when warranted. (For additional discussion, see KPF 3: Control the Spread of Disease.) Decontamination facilities may not be readily available during the early stages of self-directed population evacuations, and as a result, contaminated individuals may leave the contaminated zone and seek entry to mass care facilities such as shelters and CRCs. As a result, such facilities may require capabilities for both health screening and decontamination to accommodate those who were not decontaminated at the primary incident location or another location prior to transport to the mass care site, and to prevent contaminated persons from spreading infection to others.

A coordinated approach to decontamination and infection control procedures should be determined by incident command, public health officials, and SMEs, and should be communicated to the public and to all mass care facilities. Such coordination is essential to maintaining calm in survivors and reducing the number of additional people seeking medical care, which could otherwise strain available resources and complicate public messaging. Public communications should clearly describe recommended actions for those leaving an incident site with potential exposure, those sheltering-in-place, and those displaced. Such recommendations may include procedures for self-decontamination and containment of potentially contaminated clothing or personal items. Animal health officials should contribute to public communications on recommended actions for household pets and service animals that may have been exposed and provide additional details on available veterinary care.

Figure 33: First responders performing animal decontamination and guiding human decontamination[79]

Coordination Opportunity

Work with local public health officials, HCCs, and HAZMAT teams to understand capacity for decontamination support.

Coordinate and establish partnerships with animal health officials and veterinarians who have expertise and experience in handling animals and conducting animal decontamination. Establish mutual aid agreements with nearby jurisdictions for the provision of animal decontamination resources.

Action Item

- Establish plans and potential locations for decontamination activities near or collocated with shelter locations.
- Emergency management planners should draft decontamination plans in coordination with planners from public health and HCCs to increase the likelihood of being practical and effective.

What Will You Need To Know?

☐ Who can provide decontamination support and where will decontamination occur?

[79] (Left) (n.d.) *Cow* [Photograph]. animaldecon.com; (right) n.d.) *Horse Decon* [Photograph]. animaldecon.com; (right) (2012, August 9). *Decon at Vibrant Response 13* [Photograph]. https://www.dvidshub.net/image/642841/decon-vibrant-response-13

☐ Where will decontamination waste and contaminated items be collected, moved, or stored until proper disposal?

What Would You Do?

...if the occupants of a city block need to be decontaminated and evacuated?

...if a family and their dog arrive at a CRC but have not been decontaminated yet?

4.7 Public Fear and Mental Health Impacts

Biological incidents can leave a unique psychological footprint on affected populations because they often occur without warning, may turn their friends and family into sources of a hazard if the agent is transmissible, may produce unfamiliar or unknown short- and long-term health effects, and can result in long-term threats and long-duration recovery for the community at large. Questions about related health effects such as delayed onset of symptoms or long-term health impacts, including effects on immunocompromised persons, pregnant women, older adults, and children, will be at the forefront of community concerns. Unlike natural disasters, when neighboring jurisdictions and affected communities often come together to respond and recover, outsiders may be less willing to provide response assistance after a biological incident due to fear of infection. This could potentially increase the mental health burden on an affected community following a biological incident compared to other, non-biological incidents. Psychological health impacts due to biological agent exposure can also extend far beyond the geographical area in which the actual physical exposure occurs.

"Amerithrax," as the 2001 anthrax attacks came to be known, elicited widespread fear and panic as multiple anthrax-laced letters arrived at congressional offices and media outlets, killing five and sickening seventeen.[80]

[80] Ursano, R.J. (Ed.). (2002). *Responding to Bioterrorism: Individual and Community Needs*. Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University of the Health Sciences. https://apps.dtic.mil/sti/pdfs/ADA406540.pdf; Guillemin, J. (2011). *American Anthrax: Fear, Crime, and the Investigation of the Nation's Deadliest Bioterror Attack.* Holt & Company.

Figure 34: Counseling services can support calming fear and anxiety for communities impacted by a biological incident[81]

Feelings of anxiety following a biological outbreak or attack may be directly related to a lack of familiarity with the pathogen and confusion regarding information provided by officials and media outlets. News stories and images of worst-case scenarios may increase the public's perceived risk compared to actual risk and may give the impression that everyone requires medical attention. Intentional attacks may cause heightened fear and anxiety due to feelings of vulnerability and the possibility of a secondary attack. Whether an attack is announced or unannounced (e.g., time passes before it is known that an attack has occurred), mass hysteria may ensue due to fear of exposure and the unknown. Promptly addressing these fears by communicating timely and accurate information in coordination with local public health authorities is a high-priority action that requires planning. Individuals will feel more empowered to make decisions that protect themselves, their loved ones, and their communities when they are given clear, factual, and frequently updated information about the incident. (Refer to KPF 2: Communicate with External Partners and the Public for information about effective communication during a biological incident.)

Services such as debriefing, counseling, or support groups facilitated by behavioral health professionals—particularly for those who have lost loved ones or find themselves in financial distress due to the incident—may lessen the negative toll taken on impacted individuals. SLTT officials should plan to support accessible services for all vulnerable populations (including those facing financial hardship). These services can be facilitated by establishing partnerships with community organizations. Local NGOs and VOADs may be willing to offer services such as counseling to those impacted by the disaster for free or at discounted rates, offer programs which assist in transporting homebound individuals to appointments, or offer virtual support programs to those who are unable to or do not wish to attend appointments in person.

[81] Mint_Images (n.d.). [Photograph]. https://elements.envato.com/woman-and-female-therapist-in-face-masks-at-a-ther-SKBB89P

Behavioral health issues may be significant and could overwhelm existing counseling professionals and facilities, especially since biological incidents will call for less traditional methods of delivering psychological support such as virtual visits.

Coordination Opportunity

Build relationships with mental health partners, public health officials, private and public medical providers, substance use disorder facilities and staff (e.g., licensed addiction counselors), community stakeholders, academic institutions, and school officials. Together, establish the role of partners in mental health services during an emergency and develop agreements for the provision of mental health staff, including medical and psychology students, following an incident. Pre-identify mental and behavioral health services that can be offered to disaster survivors and establish contracts to ensure that these services will be available following an incident.

Refer To

- Department of Veterans Affairs *Disaster Mental Health Services: A Guidebook for Clinicians and Administrators* for more information on the types of mental health services that can benefit impacted communities, recommended timelines for offering specific services after or during incidents, and the many government and community-based organizations that are available to assist in providing disaster-related mental health services
- SAMHSA Disaster Technical Assistance Center for SLTT provider resources for behavioral health needs after a disaster. Other SAMHSA disaster resources include the Disaster Distress Helpline and Disaster Mobile App
- SAMHSA *TAP 34: Disaster Planning Handbook for Behavioral Health Service Programs* (2021) on disaster plan development guidance for behavioral health services and substance use disorder treatment programs

Action Item

- Establish a disaster mental health preparedness working group to develop community objectives for disaster mental health services and procedures for emergency response.
- Ensure community objectives are incorporated into the community's overall disaster plans and address the needs of survivors, responders, and the community.
- Establish links and referral mechanisms between mental health specialists, general healthcare providers, substance use disorder facilities and staff, community-based support

groups, and other services (e.g., schools and emergency relief services such as those providing food, water, and housing/shelter).

What Will You Need to Know?

☐ What mental health services and substance use disorder services are available in your jurisdiction for those impacted?

4.8 Federal Assistance for Mass Care and Human Services

During a multi-state or catastrophic biological incident, or in the case of biological incidents requiring specialized, limited availability MCMs, there most likely will be shortages of critical resources. Needs may rapidly exceed the capabilities of SLTT departments, agencies, and NGOs in affected and nearby jurisdictions. Mitigation measures intended to slow the spread of disease may dramatically increase the strain placed on critical infrastructure, particularly regarding critical medical and non-medical supply chains. Additionally, sudden, widespread, incident-caused loss of employment may place unprecedented strain on social services programs. Disease burden, income loss, economic hardship, disruptions to the food supply chain, and necessary mitigation measures such as social distancing and the closure of schools, may stress or otherwise undermine both community and individual resiliency. Unanticipated consumer demand, limited domestic production, and disrupted supply chains may lead to substantial cascading impacts that further destabilize national, regional, and/or local supply chains and may not be mitigated or overcome by either state/local governments or the private sector.

Figure 35: Interruptions can impact critical infrastructure personnel and supply chains

When federal support is requested during a disaster response, ESF #6, Mass Care, Emergency Assistance, Housing, and Human Services provides a framework for delivering mass care. Within this framework, services and programs implemented to assist individuals impacted by potential or actual disasters are organized into four primary functions: mass care, emergency assistance, housing, and human services. Additional federal support activities are directed by ESF #8 – Public Health and Medical Services (coordinated by HHS), ESF #10 – Oil and Hazardous Materials Response (coordinated by EPA), and ESF #11 – Agriculture and Natural Resources (coordinated by USDA).

As part of ESF #11, the USDA FNS identifies, secures, and arranges for the transportation of food and/or the provision of nutritional assistance to affected areas and supports FEMA Mass Care in

providing food for shelters and other mass feeding sites. These efforts include the activation of programs such as The Emergency Food Assistance Program; Commodity Supplemental Food Program; National School Lunch Program; Summer Food Service Program; Seamless Summer Option; Supplemental Nutrition Assistance Program; Pandemic Electronic Benefit Transfer; Women, Infants and Children Program; Senior Nutrition Program; Home-Delivered Nutrition Services; and Child and Adult Care Food Program.

When jurisdictional sources of support have been exhausted, SLTT officials should escalate requests for assistance. FEMA will coordinate logistics across federal resources to support SLTT, NGOs, and VOADs in performance of mass care, emergency assistance, housing, and human services missions.

Refer To

- DHS *National Response Framework* (NRF), Emergency Support Function #6: Mass Care, Emergency Assistance, Housing, and Human Services (2008)
- FEMA *Mass Evacuation Incident Annex* (2008)
- DHS *National Disaster Recovery Framework* (NDRF), Health and Social Services Recovery Support Function (2011) highlights the importance of responding to incidents at the most local level possible and can bolster the self-sufficiency of impacted communities as they work toward maintaining their population's health and well-being
- DHS *Planning Considerations: Evacuation and Shelter-in-Place, Guidance for State, Local, Tribal, and Territorial Partners* (2019)
- FEMA *Post-Disaster Reunification of Children: A Nationwide Approach* (2013)
- FEMA *Individual Assistance Program and Policy Guide* (2019)
- FEMA *Mass Care/Emergency Assistance Pandemic Planning Considerations* (2020)
- FEMA *COVID-19 Pandemic Operational Guidance for the 2020 Hurricane Season* (2020), Appendix C provides planners with a checklist of factors to consider when developing plans to restore services under each of the community lifelines during a pandemic. While not all biological incidents are pandemics, many of the considerations listed in the checklist are broadly applicable to biological incidents
- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 7 – Mass Care and Capability 15 – Volunteer Management

Coordination Opportunity

Coordinate with federal entities, surrounding jurisdictions, NGOs, VOADs, faith-based organizations, and private sector entities to ensure that your jurisdiction has access to the

resources necessary for providing mass care services during a biological incident. Jurisdictions should develop relationships with the private sector that can be leveraged during an incident. The local market economy and supply chain should be empowered and reinforced, rather than replaced or forced into competition with external resources.

Action Item

- Identify supply chain vulnerabilities and dependencies that could impact sheltering, feeding, etc.
- During an incident, coordinate with NGOs and/or VOADs to distribute available resources to your community.

What Will You Need to Know?

- ☐ How will assistance from voluntary agencies and organizations be coordinated?
- Do the agencies/organizations have specific policies regarding assistance during a biological incident?
- ☐ How will you gather and synthesize information in order to continue evaluating requirements for medical and behavioral health services to affected populations?

KPF 5: Augment Provision of Health and Medical Services to the Affected Population

A wide range of public health and medical services – including clinical care, patient movement, medical supply chain logistics, and fatality management – may be needed during the response to and recovery from a biological incident. Due to the size, scope, and/or complexity of a biological incident, these needs may overwhelm existing state and local capabilities and resources, causing significant strain across impacted communities. Limited availability of supplies, space, and personnel during response and recovery should be anticipated during a biological incident. KPF 5 will help planners consider resources needed to provide health and medical services during a biological incident to minimize morbidity and mortality and support stabilization of the Health and Medical Lifeline.

5.1 Medical Care Considerations

Most biological incidents will develop slowly, providing time for public health officials to identify the causative biological agent, corresponding MCM that will help prevent or treat illness (if available), and affected communities to receive MCMs (e.g., antibiotics, antivirals, etc.). While slowly developing biological incidents allow time to prepare, they may still significantly impact health and medical services depending on their scale and length. Rapidly developing biological incidents (e.g., intentional release of a biological agent) are rare, and these incidents present different challenges to health and medical services related to acute care capacity, immediate MCM availability, and other necessary resources.

Figure 36: Healthcare workers treating COVID-19 patients

Hurdles Facing Health and Medical Services

The provision of health and medical services to the affected population following a biological incident faces several hurdles, including, but not limited to:

- First responders and healthcare personnel may have to provide medical care without knowing the identity of the biological agent and are likely to be at increased risk of exposure. They may be asked to conserve scarce resources including PPE or to modify care and treatment depending on the nature of the incident.
- The lack of pathogen-specific MCMs (e.g., vaccines, therapeutic drugs, diagnostic tests, etc.) for the biological agent involved may lead to high morbidity and mortality.
- Local healthcare and public health infrastructure can be overwhelmed by the sheer number of individuals seeking care in a short period of time and may be ill-equipped and ill-prepared to handle mass casualty and mass fatality events.
- An overwhelming volume of patients, most of whom are likely to be minimally exposed, seeking medical care with no quickly discernable way (e.g., diagnostic test) to determine actual exposure and predict who will become ill presents challenges to effective treatment.
- Exposed or contaminated patients may pose hazards to prehospital personnel, as well as healthcare providers and other patients in a hospital emergency department setting.
- Hospitals may be unprepared to implement patient decontamination in the instance of an "announced" attack, including for self-presenting individuals with unknown contamination status. (Refer to KPF 3: Control the Spread of Disease, for more information on decontamination.)

Several characteristics of a biological incident may amplify the demand for medical and health resources: public concern over exposure, potential for initial signs and symptoms to be similar to those seen with common infectious diseases (e.g., cough and runny nose with common cold, fever and sore throat with strep throat), and lack of definitive knowledge about the boundaries of the affected geographical area. By providing clear, concise, and timely information to the public, public health and emergency management officials may help reduce those presenting unnecessarily for medical care (Refer to KPF 2: Communicate with External Partners and the Public).

Ultimately, once the pathogen and/or source have been identified, this information can guide medical treatment to ensure the best health outcomes possible. Medical care should also include behavioral healthcare, as biological incidents have the potential to increase stress and fear, especially if intentional and transmissible. (Refer to KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population for more information surrounding behavioral health resources.)

Provision of available treatment should occur without disruption of baseline medical services. The affected community will continue to need reliable access to medications and care for conditions and injuries unrelated to the biological incident. Emergency managers can provide logistical support for

health and medical services through early coordination and frequent communication with public health officials and HCCs during biological incidents. For example, emergency management planners should work with public health and healthcare planners to incorporate considerations regarding the needs of diabetic patients, patients on dialysis, patients receiving antiretroviral therapy, transplant patients, individuals receiving addiction treatments, and other special patient populations into their respective plans.

5.2 Medical Countermeasures Use in Healthcare Facilities

SLTT entities may lack the capability to immediately provide sufficient care and MCMs in the aftermath of a biological incident. MCM distribution may be challenging due to limited availability, overwhelming demand, and requests beyond impacted areas. Available MCMs should be prioritized for healthcare facilities. Closed PODs may be necessary to set up within hospitals to provide patients and staff with MCMs, where appropriate. If closed PODs are established to provide healthcare personnel with MCMs, the public should be informed not to go to hospitals for MCMs unless specifically instructed to do so due to the potential to overwhelm hospital systems.

Over time, individuals receiving MCMs (or having received them in the past) may perceive to be experiencing adverse effects associated with treatment. While there is not necessarily an increased risk of adverse effects from MCMs compared to that of any medical treatment, all persons concerned about possible adverse effects resulting from MCM administration should seek medical attention and follow up with their healthcare provider to fully investigate their concerns. Medical care related to addressing adverse effects from MCMs is supported by the Public Health Readiness and Emergency Preparedness Act (PREP) Act.

5.3 Healthcare Resilience

Depending upon the size, severity, and duration of the incident and the robustness of local healthcare and public health infrastructure, SLTT capacity to provide appropriate care and services in response to a biological incident can be quickly overwhelmed. Plans should be made in coordination with public health officials and HCCs for monitoring the capacity of emergency departments and hospitals as well as the continued availability of medical supplies. Healthcare capacity to adapt to the overwhelming need depends on the implementation of triage of available hospital beds, patients, and EMS; load-balancing through use of alternate care sites (ACS) or hospitals that were not impacted; and other forms of care adaptation, such as modified care standards or the use of non-traditional locations to provide needed services.

Biological incidents may lead to the triage or prioritization of available hospital beds, including critical care space and capacity. To ensure the right resources reach those most in need, triage of patients will be critical with respect to no-notice biological incidents and also may be required for naturally occurring disease events when they are contagious and have had time to spread throughout the population. Prioritization of patients and use of triage also may occur within an individual hospital when resources are overwhelmed. While triage decisions may be made within hospitals and healthcare systems for patients and hospital beds, HCCs can facilitate coordination of these

resources to help prevent the need for triage. EMS may also implement triage procedures regarding issues such as who responds to emergency calls, which patients are transported, and where patients are transported (e.g., to a Federal Medical Station [FMS] or ACS instead of hospital). EMS triage decisions and alteration of standards will be made in coordination with HCCs and local authorities.

Figure 37: Additional hospital space during COVID-19[82]

The activation of pre-existing mutual-aid agreements with neighboring jurisdictions can help relieve pressure on local medical facilities. If the biological incident also extends into jurisdictions with which agreements have been established, resource challenges are more likely to persist. HCCs or Medical Operations Coordination Cells may initiate load-balancing in a region if a hospital or system is overwhelmed. Load-balancing may involve prehospital distribution of patients among area healthcare facilities, transferring patients from overwhelmed healthcare facilities to ones with more capacity (space, staffing, and equipment), or moving resources to support an overwhelmed facility. When put into place, triage and care adaptations should be openly communicated to the community.

Planners should consider how logistics assistance may mitigate the need to implement triage or care adaptations.

Healthcare and public health infrastructure resilience may be unavoidably impacted by supply chain disruptions resulting in limited availability of PPE, pharmaceuticals, medical equipment, and other critical resources. Insufficient PPE may lead to reuse of equipment designed for single use and increased exposure (and anxiety for potential exposure) among first responders and healthcare personnel. Supply chain disruptions may also lead to increased cost of PPE, as seen during the COVID-19 pandemic. While mutual-aid agreements may allow for transfer of PPE during a local or

[82] Shutterstock. (n.d.). *Construction site of tents for overflow capacity for hospitals* [Photograph]. https://news.weill.cornell.edu/news/2020/10/in-brief-comprehensive-review-identifies-six-hospital-capacity-planning-models-for

regional incident as discussed above, these agreements may be of little assistance if supply chains are disrupted nationally or internationally.

Challenges and Changes in Healthcare during the COVID-19 Pandemic

For much of 2020, normal medical care was constrained as facility space, staff, and resources (e.g., medical equipment, PPE) were in high demand due to the COVID-19 pandemic. The situation was further complicated in several jurisdictions facing concurrent disasters including hurricanes, wildfires, regional-scale flooding, civil unrest, etc. Care adaptation and triage occurred during the COVID-19 pandemic in the U.S., as EMS transported patients to non-acute care hospitals and ACS,[83] EMS modified protocols for care related to cardiac arrest,[84] hospitals adapted care based on available resources,[85] and state licensing requirements were altered/waived in order to accept out-of-state healthcare workers.[86]

Coordination Opportunity

Coordinate with hospitals and HCCs to:

- Ensure procedures exist for patient triage, load-balancing, and care adaptation for biological incident response.
- Facilitate mutual aid agreements for biologic products, drugs, and devices. Such agreements are often supported by HCCs funded via HHS ASPR Hospital Preparedness Program (HPP) grants.
- Coordinate with public health officials and HCCs to provide logistical support for supply chains to help ensure the availability of PPE and other critical resources and mitigate the implementation of care adaptations.

[83] Duncan, Dave. (2020, March 7). *Policy to implement the emergency proclamation of the governor on the use of alternate destination.* Emergency Medical Services Authority. https://emsa.ca.gov/wp-content/uploads/sites/71/2020/03/Policy-on-COVID-19-and-AD-3-7-20.pdf

[84] Gausche-Hill. (2021, January 4). *Revised: EMS transport of patients in the traumatic and nontraumatic cardiac arrest.* Emergency Medical Services Agency. http://file.lacounty.gov/SDSInter/dhs/1100458_Directive_6revTransportofTraumaticandNontraumaticCardiacArrest.pdf

[85] Idaho Department of Health and Welfare. *Crisis Standards of Care*. https://healthandwelfare.idaho.gov/crisis-standards-care

[86] Office of the Texas Governor. (2020, March 14). *Governor Abbott Fast-Tracks Licensing For Out-Of-State Medical Professionals*. https://gov.texas.gov/news/post/governor-abbott-fast-tracks-licensing-for-out-of-state-medical-professionals

Action Item

Planners should work with hospitals and HCCs to develop strategies for guiding the movement of resources and patients following a biological agent release or infectious disease outbreak to ensure medical needs are safely met. Efforts should include:

- Determining requirements for, and sources of, the health and medical services resources needed
- Developing protocols and procedures for timely communication with supporting and receiving agencies to maintain situational awareness of healthcare infrastructure and service status
- Developing messaging strategies that can effectively direct pre-arrival patient movement to hospitals that have needed resources or are not overwhelmed
- Developing jurisdiction-wide healthcare provision strategies that can accommodate large numbers of patients while implementing decontamination procedures

Establish pre-incident MOUs/MOAs for resource sharing.

Review state, regional, and local plans for augmenting the provision of health and medical services, including Emergency Management Assistance Compacts (EMACs).

Consider ways to ensure priority care needs are met and access to pharmaceuticals continues.

Anticipate and develop workarounds for potential medical supply chain disruptions, including alternative contract arrangements, as appropriate.

Refer To

- EMAC, a compact for state-to-state personnel, equipment, supply, and other assistance

HHS ASPR TRACIE resources:

- EMS Infectious Disease Playbook (2017) for information on infection control for EMS personnel
- *Medical Operations Coordination Cells Toolkit* (2021) for more information on SLTT load-balancing across healthcare facilities and systems
- Topic Collection: Alternate Care Sites (including shelter medical care) and COVID-19 Alternate Care Site Resources for more information on ACS resources

What Will You Need To Know?

☐ Where are the hospitals and clinics in your region? What are their specialties/capabilities, number of beds, intensive care unit capacity, and number of ventilators and respirators?

- ☐ What are the locations and capabilities of SLTT public health resources?
- ☐ Does your jurisdiction have an existing HCC? What role does emergency management serve to support their collaborative work?
- ☐ How will surge and/or care adaptations be addressed at hospitals and healthcare facilities?
  - What stakeholders should be engaged for discussion around need for care adaptations as well as specific adaptations?
  - How will this be communicated to the community?
- ☐ What are the likely types of supply chain disruptions that you might expect to see in larger-scale scenarios?
- ☐ How will medical resources be prioritized? How will this be communicated to the community?
- ☐ How will you manage the asymptomatic, possibly exposed populations?
- ☐ What are the pertinent MOUs and MOAs (for medical care, lab services, etc.)?
- ☐ How will you know the impact (and projected impact) on the workforce – first responders, emergency management, hospitals, clinics, laboratories, other medical and public health professionals?
  - What workforce and logistical considerations will be necessary to work around the workforce impacts?

5.4 Veterinary Care

Many pathogens capable of causing a biological incident among people are unlikely to harm companion animals. However, some biological agents may cause disease across species. During biological incidents involving zoonotic diseases, healthcare resilience may require addressing veterinary medical support, including triage and treatment. Household pets and service animals may require veterinary care to alleviate and reduce adverse health outcomes. Veterinary care is also discussed in KPF 3: Control the Spread of Disease, and KPF 4: Augment Provision of Mass Care and Human Services to the Affected Population.

Coordination Opportunity

Collaborate with community veterinary partners and SLTT animal health officials to generate updated guidance and flexible plans that ensure continuity of care and help mitigate potential medical supply chain disruptions. Work to ensure all aspects of plans can be effectively executed in a pandemic or other high medical need environment.

Refer To

- HHS ASPR TRACIE Topic Collection: Veterinary Issues for more information on disaster-related animal health resources
- NASAAEP *Disaster Veterinary Care: Best Practices* (2012)
- For issues related to livestock and poultry, refer to DHS *National Food and Agriculture Incident Annex to the Response and Recovery Federal Interagency Operational Plans* (FAIA; FIOPs) (2019)

5.5 Fatality Management

Fatality management within the broader context of biological incident planning varies across SLTT jurisdictions. Three of the biggest challenges facing fatality management during a biological incident are: (1) human and animal remains may be contaminated; (2) fatalities may represent critical pieces of evidence in a law enforcement or safety investigation if the incident is suspected to be intentional; and (3) local morgues, refrigeration capability, funeral homes, and cremation facilities may be overwhelmed. Therefore, fatality management protocols should be adaptable to the specifics of the biological incident. Such protocols should consider approaches for handling and recovery, identification and tracking, transportation and storage, embalming and cremation thruput, and disposal of remains.[87] Temporary holding of fatalities at hospitals to supplement morgues may be required depending on size and scope of the biological incident.[88] For example, refrigerated mortuary trailers were used during the COVID-19 pandemic when hospital morgues became overwhelmed. Additional morgue staff (i.e., embalmers, funeral directors, processors) may be needed to increase throughput at funeral homes and crematoriums.

[87] CDC. (n.d.). *Public Health Preparedness Capabilities: National Standards for State and Local Planning Capability 5: Fatality Management.* HHS. https://www.cdc.gov/cpr/readiness/00_docs/capability5.pdf

[88] National Association of Medical Examiners. (2010). *Standard Operation Procedures for Mass Fatality Management*. https://www.thename.org/assets/docs/31434c24-8be0-4d2c-942a-8afde79ec1e7.pdf

Figure 38: Mobile morgues deployed in New York City

SLTT planners should establish mass fatality thresholds for requiring and requesting additional support. The federal government has the ability to provide technical assistance and consultation on fatality management and mortuary affairs (discussed below).

What Would You Do?

...with human or animal remains that are possibly evidence?

Coordination Opportunity

Medical examiners, coroners, embalmers, federal support teams (Disaster Mortuary Operational Response Teams [DMORTs]), etc. should develop mutual aid agreements across jurisdictional boundaries that can be called upon to help coordinate fatality management needs.

Action Item

- Coordinate with jurisdictional medical examiners, coroners, and embalmers to determine requirements for and available resources for Fatality Management Services across a range of potential scenarios. Determine how emergency management and public health officials can support these functions.
- Exercise fatality management plans. Consider use of HHS ASPR *Coronavirus Disease 2019 Fatality Management Tabletop Exercise Situation Manual* (2020) for a tabletop exercise to test plans.

Refer To

- HHS ASPR TRACIE Topic Collection: Fatality Management for more information on available resources
- U.S. Army Research Development and Engineering Command and the DOJ *Capstone Document: Mass Fatality Management for Incidents Involving Weapons of Mass Destruction* (2005) for information on managing biologically contaminated remains
- FEMA EMI Mass Fatalities Incident Response Course (G0386) for mass fatality management planning and operations to assess a jurisdiction's preparedness level
- FEMA CDP Healthcare Facility Mass Fatality Management Course (HCV13 AWR-934-V13) for mass fatality management planning and preparedness considerations in a healthcare facility
- Center for Rural Development's Mass Fatalities Planning and Response for Rural Communities Course (AWR-232) for rural and tribal planning considerations for an awareness level review of mass fatality response

What Will You Need To Know?

☐ Who has the authority at the local and state level over fatality management - medical examiner, justice of the peace, other?

- What are their biological response plans?

☐ Based on the biological pathogen, what will be the fatality management protocol?

- For hazardous remains?
- For evidence?
- For cultural or religious considerations?

☐ How will you know if there are any facility capacity, workforce, or resource limitations regrading fatality management?

- If limitations arise, what will be the recommended alternatives?

5.6 Federal Assistance for Health and Medical Services

When needed, the federal government may be able to augment SLTT health and medical service needs. HHS coordinates the federal emergency public health and medical response via ESF #8 – Public Health and Medical Services, which supports medical response assistance for behavioral health needs, survivors and response workers, and veterinary health issues. Federal assistance can support health and medical services in three major ways: by providing more supplies, increased space and expanded care facilities, or personnel assistance.

5.6.1 SUPPLIES, SPACE, AND PERSONNEL ASSISTANCE

5.6.1.1 Supplies

During biological incidents of national concern, the federal government may augment MCM supply and logistics. When needed, these materials may be provided by the federal government through the SNS or through state-validated requests under Stafford Act protocols, if a President approves or makes an emergency or major disaster declaration for the incident. However, if the scale of an incident becomes regional or national, local officials' access to response resources, including the SNS, may be inhibited due to federal and state prioritization of needs. Additional SNS information can be found is KPF 3: Control the Spread of Disease.

When demand outpaces supply and there is a critical need, the Defense Production Act (DPA) serves as the source of presidential authority to expand the supply of materials and services from the U.S. industrial base and expedite delivery to promote national defense. During the COVID-19 pandemic, the DPA was invoked to increase production capacity of critically needed PPE and vaccine supplies to reduce the number of cases and fatalities.

5.6.1.2 Space

Overwhelmed healthcare systems may require SLTT emergency management assistance for the expansion of space and facilities to support stabilization of the Health and Medical Lifeline. Space and facilities assistance from the SNS through FMSs will also be considered upon request.[89] These rapidly deployable caches contain beds, supplies, and medicines that can quickly transform any large building into a temporary medical shelter to take low acuity patients during an emergency.

5.6.1.3 Personnel

Biological incidents may require personnel support for SLTT healthcare infrastructure due to exposed or ill staff being unable to work, fear of exposure among staff, patient volume, or other factors. Several departments and agencies provide federal personnel support for healthcare infrastructure. The National Disaster Medical System (NDMS) is a federally coordinated healthcare system and partnership of HHS, DHS, DoD, and the Department of Veterans Affairs that is designed to support SLTT authorities following disasters and emergencies by supplementing health and medical systems and response capabilities.

[89] Office of the Assistant Secretary for Preparedness and Response. (2021, May 14). *Medical Assistance*. Public Health Emergency. HHS. https://www.phe.gov/Preparedness/support/medicalassistance/Pages/default.aspx

National Disaster Medical System (NDMS)

Specifically, the NDMS can support patient care and movement, veterinary services, and fatality management support to requesting SLTT authorities or other federal departments via specialized teams that can be deployed in 12-48 hours (see below):[90]

- Disaster Medical Assistance Teams (DMATs)
- Trauma and Critical Care Teams (TCCTs)
- Disaster Mortuary Operational Response Teams (DMORTs)
- Victim Information Center Teams (VICs)
- National Veterinary Response Teams (NVRTs)
- National Medical Response Teams (NMRTs)

Additional health and medical assistance needs may surpass available NDMS resources, requiring a combination of skilled and non-skilled labor forces to provide service in accordance with their capabilities. Assistance may come from agencies supporting ESF #6 (Mass Care, Emergency Assistance, Housing, and Human Services), ESF #8 (Public Health and Medical Services) such as:

- HHS Commissioned Corps of the U.S. Public Health Service Readiness and Deployment Operations Group (RedDOG), available within 36 hours[Error! Bookmark not defined.]
    - Rapid Deployment Force – for mass care at shelters (including FMSs) and staffing at MCM/PPE distribution and casualty collection points (available within 12 hours)
    - Applied Public Health Team – for assistance in public health assessments, environmental health, infrastructure integrity, food safety, vector control, epidemiology, and surveillance
    - Mental Health Team – for assessing stress within the affected population and responders, and providing therapy and counseling
- HHS CDC Epi-Aid teams, which provide epidemiologic assistance to SLTT public health investigations
- Medical Reserve Corps, a national network of medical and public health professionals who are coordinated at the local level to serve as volunteers in natural disasters and emergencies

[90] Office of the Assistant Secretary for Preparedness and Response. (2017, September 9). *Calling on NDMS*. Public Health Emergency. HHS. https://www.phe.gov/Preparedness/responders/ndms/Pages/calling-ndms.aspx; Office of the Assistant Secretary for Preparedness and Response. (2021, May 14). *Medical Assistance*. Public Health Emergency. HHS. https://www.phe.gov/Preparedness/support/medicalassistance/Pages/default.aspx

- NGOs/VOADs and nonclinical volunteers

Coordination Opportunity

In addition to public health and HCCs, collaborate with local NGOs and VOADs, including medical and nursing schools as well as other healthcare-related academic training centers, to determine their capabilities and capacities. Work with these partners to develop a volunteer management plan for biological incident response.

SLTT planners should coordinate with stakeholders to ensure that mutual-aid agreements include assistance to facilitate supply sharing when national supply chains face production delays, resource prioritization occurs, or SNS resources have been depleted.

Refer To

- DHS *National Response Framework* (NRF), Emergency Support Function (ESF) # 8: Public Health and Medical Services Annex (2008)
- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 5 – Fatality Management, Capability 10 – Medical Surge, and Capability 14 – Responder Safety and Health
- FEMA Community Lifelines, specifically Health and Medical, for more information on essential operations
- DHS *National Disaster Recovery Framework* (NDRF), Health and Social Services Recovery Support Function (2011)
- Defense Support of Civil Authorities webpage for information on military support
- DPA to understand federal capabilities that help ensure protection of national security and critical infrastructure

What Will You Need To Know?

- ☐ What federal and SLTT governmental organizations will be part of the public health and medical response?
- What and how will they contribute to the incident response?
- ☐ When will NDMS teams be activated, and how are decisions made about where to send teams? Who coordinates these decisions for your jurisdiction, state, or region?

KPF 6: Augment Essential Services to Achieve Recovery Outcomes

In the context of a biological incident, planning for recovery is as critical as planning for response. Resilient and sustainable recovery encompasses not only the restoration of a community's physical structures but also the maintaining continuity of essential services and meeting the enduring needs of the community members. Recovery actions may require long-term economic support, restoration of interrupted critical infrastructure operations, site remediation, public health surveillance and behavioral health programs, monitoring of the community impact due to losses suffered and financial stress, and/or augmentation of essential services at varying levels. Mitigation of long-term incident impacts requires collaboration across community stakeholders to establish and prioritize recovery outcomes across the recovery continuum. Planning for incident recovery will facilitate the achievement of recovery outcomes for impacted communities through rapid and effective recovery operations.

6.1 Recovery Planning, Indicators, and Priorities

Essential recovery activities should be implemented as early as possible in the incident's operational phase to ensure effective and efficient attainment of recovery outcomes. Recovery following many types of biological incidents is likely to be complex, resource-intensive, and challenging. Planning for recovery before an incident occurs and initiating recovery actions during the response phase has the potential to greatly reduce the time and money spent during the extended recovery phase and improve outcomes for human, animal, and environmental health. Incident planning activities can facilitate recovery by preparing for anticipated resource needs such as medical staffing, treatment facilities, critical supplies, and mental health support for first responders and the general public, thus lessening the overall impact on the affected community and narrowing the gap to achieve recovery outcomes. Critical decisions made during the response (e.g., public health guidance issued for social distancing, early efforts to identify and conduct contact tracing for exposed individuals, etc.), if implemented early enough, can vastly improve community mitigation efforts and shorten recovery times. Many initial recovery activities can take place in parallel with response activities.

Figure 39: Achieving recovery outcomes will require meeting the multifaceted needs of the community, including housing, healthcare, and economic needs

6.1.1 CONSIDERATIONS FOR LONG-TERM RECOVERY INDICATORS

With respect to a biological incident, the extent of the recovery process and the duration of emergency management engagement in that process depend upon the extent of harm done to the community by the incident (e.g., the threshold of community harm achieved). While many types of biological incidents necessitate long-term public health and medical involvement, only those causing major disruptions beyond the health sector and throughout society likely will necessitate long-term emergency management involvement. Recovery efforts by emergency managers will vary based on a number of critical factors including, but not limited to: incident type, incident impacts, and community resilience, and response capacity.

Potential long-term recovery needs are most likely to include infrastructure, health and social services, supply chain, and economic recovery following a biological incident. Planners should consider the long-term recovery needs created by historical biological incidents as compared to their community's risk for a biological incident and ability to respond.

Table 3: Comparison of historical biological incidents, their characteristics, and long-term recovery needs

Incident	Characteristics	Long-term Recovery Needs
Sverdlovsk Anthrax Outbreak (1979)	▪ Accidental release	▪ Infrastructure recovery with site/environmental remediation
Amerithrax (2001)	▪ Intentional attack ▪ Discrete locations	▪ Infrastructure recovery with site/environmental remediation ▪ Workforce exposure impacting infrastructure, health, and economic recovery ▪ Economic impacts
Severe Acute Respiratory Syndrome (SARS) (2003)	▪ Natural outbreak ▪ Contagious agent ▪ Wide-area outbreak	▪ Workforce exposure impacting infrastructure, health, and economic recovery ▪ Health and social services impacts ▪ Economic impacts with operations modifications

Action Item

- Review federal, regional, and SLTT plans for critical response decisions/decision points for a biological incident that may impact longer-term recovery planning and operations. Coordinate planning with public health systems and HCCs in your area.
- Initiate deliberative planning processes once the biological incident and its adverse impacts are known. Deliberative recovery planning processes should focus on long-term

recovery with specific recovery goals/targets and courses of action identified, based on consensus-based decision, for senior leaders to review, deliberate, and approve for implementation beginning in the response phase.

Refer To

- HHS CDC *Public Health Emergency Preparedness and Response Capabilities: National Standards for State, Local, Tribal, and Territorial Public Health* (2018), specifically Capability 2: Community Recovery
- DHS *National Disaster Recovery Framework* (2016) for more information on how the whole community builds, sustains, and coordinates delivery of recovery capabilities
- DHS *Response* & *Recovery Federal Interagency Operational Plans* (FIOPs; 2016)
- FEMA *Pre-Disaster Recovery Planning Guide for Local Governments* (2017)
- FEMA *Pre-Disaster Recovery Planning Guide for State Governments* (2016)
- FEMA *Pre-Disaster Recovery Planning Guide for Tribal Governments* (2019)
- American Planning Association *Planning for Post-Disaster Recovery: Next Generation* (2014)

6.1.2 ESTABLISH AND REVIEW PRIORITIES FOR RECOVERY

Initial recovery objectives should be formulated during the response phase. Many response activities described earlier in this document will continue during the recovery phase, although their focus and intensity may evolve over time (e.g., return-to-work guidance for first responders following a possible exposure, prophylaxis or vaccine clinic operations, mental health support, etc.). Recovery outcomes should be established and prioritized by a broad group of community stakeholders and may need to be re-evaluated as the incident evolves.

Lead authority for many long-term recovery needs following a biological incident (e.g., dependent care considerations, healthcare resilience improvements, workforce attrition and loss, etc.) may lie outside of traditional emergency management structures. Emergency management planners should collaborate with planners from other organizations and sectors to determine how emergency management can most effectively support or coordinate stakeholders in planning for the recovery from a biological incident.

Family and Workforce Considerations

If the biological incident results in many fatalities or long-term chronic health outcomes, a community will be heavily impacted for years to come. Individuals and families may suffer devastating financial losses if someone becomes unable to work following the incident. Families who lost someone due to the biological incident will be grieving the absence of their loved one,

possibly in addition to dealing with the loss of family income after someone's passing. Arrangements for the long-term care of dependents like children and older adults must be made after a caretaker's death. The frontline workforce (e.g., public safety, healthcare workers, grocery store workers, transit operators, etc.) and may experience significant losses, burnout, and attrition within their professional communities while also having to continue performing their essential duties to serve the affected population throughout recovery.

Economic and Infrastructure Considerations

Local businesses, particularly small businesses, may be impacted for months or years to come, often without the knowledge of how long the public health measures and restrictions associated with the incident will be in effect. Restoration of commercial activity may require adaptive and innovative business practices to meet the needs of the affected population. Contaminated or disrupted critical infrastructure must be restored and supply chain pressures must be relieved or revamped to support commerce and the movement of people and goods. Arrangements may need to be put in place for the long-term closures of contaminated facilities or buildings. Schools and childcare centers must be safe for children to return; decisions surrounding the opening or closing of these facilities have enormous implications for parents. While critical infrastructure is typically not "destroyed" during a biological incident, it is the impacts on personnel and workforce shortages that are most likely to disrupt essential services.

Public Health and Medical Considerations

Local public health and healthcare systems may need to be strengthened during recovery to improve long-term resilience, including a focus on affected staff and medical logistics. Members of the affected population who were exposed to the biological agent must be identified, supported, provided with appropriate MCMs and/or longer-term monitoring, and communicated with regularly by health authorities until the risk to their physical health has been mitigated. Behavioral health concerns must also be addressed throughout the recovery phase and, in some cases, may last longer than physical health concerns. An affected community will expect updates from local health authorities throughout the recovery phase on the progress of recovery, ongoing site remediation, persistent or evolving threats, and any other pertinent issues affecting their health and safety resulting from the biological incident.

Figure 40: Disinfecting public facilities and transportation

Planners should work with traditional and nontraditional community stakeholders to establish specific recovery outcomes (e.g., community health workers) based on the whole community's needs. Examples of recovery outcomes applicable to a biological incident include:

- Lifesaving and life-sustaining assistance to SLTT and private sector entities are provided.
- SLTT governments can provide individuals and families with the means to rebound from their losses in a manner that sustains their physical, emotional, social, and economic well-being.
- Critical infrastructure capability and capacity are restored and are in operation.
- Public safety and health protection assurances are reestablished.
- Response and recovery worker safety and health protection assurances have been reestablished.
- Measures are in place to enable and restore commercial activity to meet the demand of the population. Economic impacts are minimized locally, nationally, and internationally.
- Exposed populations are fully identified and have received appropriate MCM or other interventions to protect or restore health.
- Behavioral/mental health needs of victims, responders, and other affected populations have been addressed.
- The public has been provided the necessary information to protect against or recover from the biological incident.
- Environmental assurances can be made that contaminated areas have been assessed for safety, need for decontamination, and appropriateness for re-occupancy.
- Persistent disease threats to humans from animals or any other sources have been addressed and threats from reservoirs mitigated.
- Appropriate care is identified for dependents (e.g., elderly, children, those with developmental disabilities, etc.) and animals without caretakers as a result of the incident.

- All levels of communities have been addressed: elderly, children, people with access and functional needs, people with English as a second language, people with low literacy, and people with chronic conditions; sustainable activities are in place.

Coordination Opportunity

Bring together planners from emergency management, public health, HCCs, and other private and public stakeholders (i.e., critical infrastructure systems, business community) in impacted jurisdictions to consider and formulate recovery objectives and priorities.

Planners should work closely with the private sector on economic recovery efforts to coordinate resources and provide information that will instill confidence in the long-term viability of the regional economy. Improving public health and healthcare resilience during the recovery phase will strengthen overall community health and well-being into the future.

What Will You Need To Know?

- ☐ What are recovery priorities in your jurisdiction following a biological incident? Who should be engaged from your jurisdiction to help formulate these priorities?
- ☐ How can recovery efforts be designed to improve public health and healthcare resilience long term?
- ☐ What expertise and resources will be required to remediate site-level contamination and permit safe reuse/reoccupation of impacted facilities?
- ☐ What recovery resource limitations can be anticipated? What collaborative partnerships should be considered for plans?
- ☐ What NPIs and/or MCMs may need to continue during recovery? How will they impact your community?
- ☐ What public messaging will need to continue throughout recovery? How will you coordinate with public health authorities, HCCs, critical infrastructure, and other sectors to ensure consistent public messaging from multiple organizations?

6.2 Support the Affected Community Through Recovery Support Functions

Establishing how the recovery effort will be organized, including who and what organizational structure will be used to lead it and which players will be involved, is critical to community recovery from a biological incident. The recovery phase may involve agencies and organizations that did not play a major role in the response phase, such as mental health services, small business associations, planning commissions, etc., as well as additional voluntary and private organizations may not have participated in response efforts. Recovery after a biological incident may involve ongoing healthcare worker burnout and attrition issues, long-term health effects among the affected population, challenges related to childcare centers and schools reopening, ongoing economic losses

for families whose primary income earner passed away or became unable to work, persistent business and facility closures, continuing supply chain logistics interruptions, movement of hazardous waste containing infectious substances, and, following a large event, potentially major reorganizations of entire sectors.

RSFs aid SLTT governments by facilitating problem solving, improving access to resources, and fostering coordination among multiple agencies and stakeholder organizations. During planning, RSFs can be used to organize recovery considerations into six key areas as detailed in the *National Disaster Recovery Framework* (NDRF). Following a biological incident, some RSFs (i.e., health and social services, economic recovery, infrastructure systems) are more likely to be affected than others (i.e., housing, community planning and capacity building, natural and cultural resources). It will be critical to determine which RSFs have been impacted by a biological incident and where vulnerabilities lie within an affected community. Depending on the specific characteristics of the biological agent, such as contagious nature or wide-area impact of the incident, some services provided to affected populations during response and early recovery may need to be continued long-term (e.g., health monitoring, economic support, safe and affordable, housing, etc.)

Table 4: Recovery Objectives by Recovery Support Function

Recovery Support Function (RSF)	Recovery Outcome
Health and Social Services	Sustainable and resilient health, education, and social services systems
Economic	Sustainable, diversified, and resilient economy
Infrastructure Systems	Restored, modernized, hardened and resilient systems
Housing	Adequate, resilient, and affordable housing
Community Planning and Capacity Building (CPCB)	Resilient recovery of SLTT communities
Natural and Cultural Resources (NCR)	Restored, preserved, risk-resistant and resilient systems

Coordination Opportunity

Coordinate with decision makers, emergency responders, and local RSF partners to discuss biological incident-specific concerns and questions with the whole community.

Refer To

- DHS *National Disaster Recovery Framework,* Recovery Support Functions (RSFs) webpage for more information on each of the six RSFs, which comprise the coordinating structure for key functional areas of assistance in the NDRF

6.2.1 HEALTH AND SOCIAL SERVICES RECOVERY

A community recovering from a biological incident may face long-term public health and healthcare challenges. Recovery may include providing long-term care for individuals with medical complications or chronic conditions caused by the biological agent and associated incident. Certain impacted populations and responders (e.g., law enforcement, EMS, hospital staff) may require long-term health monitoring and/or continued exposure to the biological agent while performing their professional duties. Health workers may experience exhaustion and burnout, contributing to attrition of the local public health and hospital workforce. Public trust of health authorities and medical professionals may be compromised following a biological incident, potentially creating a contentious situation influencing public cooperation during future public health emergencies.

A biological incident may expose existing weaknesses in local public health and healthcare systems. Recovery presents a unique opportunity to strengthen healthcare resilience of the affected community as it rebuilds moving forward. Resilient health systems adapt to disruption and withstand challenging events, while continuing to provide quality care for patients.[91] To increase local resilience, after-action planning, coordination, and capacity-building between public health, hospitals, EMS, outpatient clinics, long-term care facilities, clinical laboratories, medical suppliers, schools, childcare centers, and others must be improved. Working relationships built across sectors during the biological incident response may need to be formalized or established on a more permanent basis long term. Community decision makers should use trends observed and lessons learned during a biological incident in their area to inform strategic plans to fortify local healthcare resilience into the future.

[91] Wiig, S., Aase, K., Billett, S., Canfield, C., Roise, O., Nja, O., Guise, V., Haraldseid-Driftland, C., Ree, E., Anderson, J., Macrae, C. (2020). Defining the boundaries and operational concepts of resilience in the resilience in healthcare research program. *BMC Health Services Research 20*(330). https://doi.org/10.1186/s12913-020-05224-3

Figure 41: Vulnerable populations may include daycare centers, preschools, nursing homes, and assisted living facilities

To attain recovery outcomes, health systems must address the physical health needs of affected populations, as well as a wide range of potential psychological, emotional, and behavioral health needs associated with the incident. Additional issues may develop long after the initial response phase of the incident is complete.[92] As recovery evolves, vulnerable populations like children and English-language learners may require continued social support to recover from incident stressors such as time spent away from school, falling behind in coursework, and lack of socialization with peers. Existing health issues such as struggles with mental health or substance use disorders in the community may be exacerbated following a biological incident and its effects. Long-term behavioral health assistance may include psychological support and crisis counseling, providing information and educational resources, conducting assessments, and referring patients for treatment of behavioral health or substance use disorders.

Emerging infectious diseases may present new and unfamiliar challenges to a population experiencing a biological incident. As new MCMs (e.g., vaccines, therapeutic medications) are developed, researched, and approved for novel pathogens, different segments of the population may be eligible to receive them at different times. Health authorities and trusted medical professionals must communicate the safety and efficacy of new treatments to the affected community in a timely, easy to comprehend, and transparent manner. Public and animal health organizations will also need to monitor long-term impacts of a biological incident on local animal populations (household pets, livestock, and wildlife), especially if the biological agent is zoonotic (i.e., a pathogen that jumped from animals to infect humans).

[92] Russell, B.S., Hutchison, M., Tambling, R., Tomkunas, A.J., Horton, A.L. (2020). Initial Challenges of Caregiving During COVID-19: Caregiver Burden, Mental Health, and the Parent–Child Relationship. *Child Psychiatry & Human Development, 51*, 671–682. https://doi.org/10.1007/s10578-020-01037-x

Coordination Opportunity

Collaborate with local emergency management, public health, and HCCs to develop plans to strengthen healthcare resilience over the long term based on post-incident after action reporting and the cataloguing of lessons learned. Collaborate with local behavioral health providers to identify resource requirements and plan for long-term, equitable support to the affected community. Coordinate with local social services agencies and organizations to understand existing vulnerabilities within the community pre-incident and to best prioritize needed services moving forward. Coordinate with SLTT animal health officials to discuss ongoing surveillance of relevant pathogens in household pets, livestock, and/or wildlife as indicated.

Action Item

- Identify affected populations, groups, and key partners in recovery.
- Complete an assessment of community health and social service needs; prioritize these needs based on the whole community's input and participation in the recovery planning process; and develop a comprehensive recovery timeline that includes consideration of available human and budgetary resources.
- Restore healthcare (including behavioral health), public health, and social services functions and supporting supply chains.
- Restore and improve the resilience and sustainability of the healthcare system and social service capabilities and networks to promote the independence and well-being of community members in accordance with the specified recovery timeline.
- Implement strategies to protect the health and safety of the public and recovery workers from the effects of a post-disaster environment.
- Establish long-term coordination mechanisms with public health systems, including passive monitoring systems, to facilitate information sharing to achieve established recovery outcomes.
- Collaborate with local private organizations and NGOs for behavioral and mental health support services.

Refer To

- HHS ASPR TRACIE Disaster Behavioral Health webpage for more information on available resources
- SAMHSA Disaster Behavioral Health Resources webpage

- HHS Disaster Behavioral Health and Disaster Behavioral Health: Federal Response and Assets webpages
- American Red Cross Emotional Responses resources webpage

What Will You Need To Know?

- ☐ Within healthcare and public health, how will you know the status of critical services facilities and their providers and make appropriate adjustments as needed during the recovery phase?
  - Medical and public health?
  - Behavioral health?
  - Social services?
- ☐ How will you identify and remediate specific issues that may impact the longer-term healthcare resilience of the affected community?
- ☐ How will you collaborate with partners in healthcare, public health, public safety, and emergency management and private-sector supply chain providers to fortify healthcare resilience over the long term?
- ☐ What will be needed to support the management and care of dependents at congregate care facilities when normal caregivers are absent (e.g., nursing homes, prisons, and congregate animal facilities such as zoos, etc.)?
- ☐ How will human remains be processed? How will you know if there are any workforce, resource and/or logistical issues? Will any special permits be required?
- ☐ How will public health actions be determined?
- ☐ What counseling support services are available in your community? What are their capacities?
- ☐ What behavioral health support services are available for response workers long term?
- ☐ How will you ensure equitable access to behavioral health and other support services?

6.2.2 ECONOMIC RECOVERY

A biological incident has the potential to greatly harm local, regional, national, and international economies. Economic recovery after a biological incident is characterized by the successful return of economic and business activities within a sustainable, diversified, and resilient economy. Pre-disaster recovery planning specific to biological incident impacts can dramatically reduce the time needed to meet economic recovery challenges by thoroughly engaging economic recovery stakeholders and their networks and leveraging existing resources. After an incident, the economic recovery needs of local businesses, individuals, nonprofits, and governments tend to shift as time progresses.

Immediate and downstream economic effects may be inadvertently created when compliance with public health orders leads to modified operating procedures and business closures. Employers may be forced to temporarily close or permanently relocate due to labor shortages/workforce attrition, supply chain disruptions, lack of customers, longer-term environmental concerns, etc. These economic impacts also affect the community with a loss of income or savings. Ultimately, communities may need support for economic revitalization in the aftermath of a biological incident.

Planners must collaborate with the public sector, nonprofits, chambers of commerce, workforce development organizations, local governments, regional planning organizations, and private organizations to assist with economic revitalization increasing employment opportunities, remediating deficiencies effectively, managing supply chains more efficiently, and rebuilding public trust. Economic impacts may stem from business closures, job loss, supply chain disruptions, etc. and may also stem from public fear. In 2016, for example, the fear of contracting Zika virus disease in Florida had economic impacts on the tourism industry.

To achieve economic recovery outcomes, planners must consider the varying economic impacts biological incidents will have in their jurisdiction. Biological incidents involving a contagious agent will necessitate response measures (i.e., quarantines and movement controls that are highly effective at limiting disease spread) that may also disrupt typical business operations and create subsequent long-term recovery challenges. However, biological incidents with a discrete location – whether they are intentional, accidental, or naturally occurring – may necessitate similar response measures without leading to the same associated long-term, widespread economic recovery impacts. Planners should consider how the varying public health orders that may be implemented during response will impact recovery. Furthermore, planners can increase the adaptability of their jurisdiction's plans by accounting for varying mitigation measures to facilitate rapid recovery.

Coordination Opportunity

Community engagement during the planning process is essential to attain economic recovery outcomes. Build relationships with service providers and business leaders in your region. Develop agreements for sustained provision of services and economic revitalization building activities while working toward recovery outcomes.

Action Item

- Develop economic recovery plans with economic stakeholders including SLTT governments, public or private businesses, local business organizations, etc.
- Assign stakeholder roles and responsibilities to help identify major issues through stakeholder suggested response and recovery strategies and available resources.
- Explore incentives to include in your plans to help businesses overcome challenges; identify and eliminate disincentives when and wherever possible.

- Engage your local Small Business Association (SBA) when reviewing or creating your plans.

Refer To

- SBA *Disaster Preparedness and Recovery Plan* (2019)
- SBA Disaster Assistance webpage for more information on how to facilitate recovery actions for small businesses

What Will You Need To Know?

- ☐ How will your biological incident recovery plans mitigate long-term economic challenges?
- ☐ How will you identify and take action to mitigate the economic impacts of long-term supply chain issues?
- ☐ What economic business recovery assistance is available through private sector partners?
- ☐ How can local governmental and private sector partners support lost worker income?
- ☐ Are there existing regional agreements that will influence or inform your biological incident planning efforts (e.g., existing EMACs with neighboring jurisdictions, international border considerations)?
- ☐ What local recovery resources are available to support economic recovery for recurrent outbreaks?
- ☐ What support is available to local tourism businesses?
- ☐ What are the associated economic impacts related to travel restrictions for non-essential activities?
- ☐ What programs are available to maintain business continuity and support recovery?

6.2.3 INFRASTRUCTURE SYSTEMS RECOVERY

A biological incident will impact infrastructure systems differently than other types of disasters. Long-term impacts for the operation of critical services and infrastructure during recovery may be ongoing due to long-term community NPIs, personnel illness/workforce attrition, reduced capacity, facility contamination, and/or long-term supply chain impacts.

While resource owners play the primary role in including resilience activities and identifying the greatest vulnerabilities in terms of their systems and the people and businesses they serve, achieving recovery outcomes for the whole community depends on fully operational critical infrastructure systems and the supporting workforce. Long-term shortages of critical infrastructure operators due to illness or exposure in the context of extended outbreaks or pandemics and other workforce attrition issues may prevent systems from being fully functional and may lead to disruptions in continuity of critical services, supply chain logistics, essential personnel movement,

and facility safety and security. To facilitate recovery from a biological incident, planners should anticipate and identify approaches to mitigate workforce shortages and attrition due to worker illness, unavailability of childcare, need to care for someone sick within their household, etc. In addition, planners must account for prioritization of MCM dispensing and administration to essential workers in critical infrastructure sectors such as transportation, energy, and communications, among various others.

Figure 42: Recovery may require protective measures for critical infrastructure operation[93]

While recovery from most biological incidents will not require decontamination of a physical space, some biological agents will require immediate containment, establishment of clearance goals, and cleanup initiated during response in coordination with public health officials (as discussed in KPF 3: Control the Spread of Disease) to achieve recovery outcomes. Incidents with a discrete location may require long-term barriers or remediation activities (e.g., anthrax release in a train station). The goal of these activities is to eliminate or reduce contamination of the population, environment, and critical infrastructure to facilitate rapid recovery. The sustained health effects associated with contaminated water systems will require a coordinated public messaging focus well into the recovery phase (see KPF 2: Communicate with External Partners and the Public) with status updates on how the incident is being addressed and any protective actions in effect (e.g., when boil water orders are no longer necessary).

The type of biological agent involved can also have an impact on recovery-focused activities such as hazardous waste transport, processing, and disposal. Infectious substances are regulated by the U.S. Department of Transportation's Hazardous Materials Regulations (HMR) and generally fall into three groups: Category A (in a form causing permanent disability or life-threatening or fatal disease), Category B (not in a form generally capable of causing permanent disability or life-threatening or fatal

[93] Griggs, C. (n.d.). *Air traffic controllers work in their tower wearing protective gear* [Photograph]. Air Force. https://www.defense.gov/News/Feature-Stories/Story/Article/2160380/air-force-materiel-command-operations-continue-despite-covid-19/#pop4159192

disease), and Regulated Medical Waste.[94] As examples, Ebola-contaminated waste was classified as Category A,[95] while COVID-19 contaminated waste was classified as Category B,[96] which resulted in differing requirements for transporting waste based on the pathogen. All HMR requirements must be met when infectious substances are transported by air, highway, rail, or water. Infectious Substance Special Permits may be required when shippers are unable to comply with HMR. Ebola waste, identified as Category A above, was unable to cross state lines without issuance of these special permits.[97] Management of large quantities of hazardous waste may prove challenging and further drain resources through recovery.

Coordination Opportunity

Collaborate with local jurisdictions to develop mutual aid agreements for resource sharing due to long-term critical infrastructure interruptions.

Collaborate with local waste management organizations (private and governmental) to pre-establish waste containment and disposal methods as well as auxiliary disposal sites.

Action Item

- Identify and plan for key incident indicators and recovery resources for local critical infrastructure.
- Identify the locations and vulnerabilities of critical infrastructure in your jurisdiction.
- Prioritize critical infrastructure and services restoration based on factors such as infrastructure or service asset status, interdependencies, and relationships to recovery objectives; contributions to services; workaround availability; and recovery milestone requirements.

[94] U.S. Department of Transportation (DOT) Pipeline and Hazardous Materials Safety Administration. (2020, April 2). *Transporting Infectious Substances Overview*. https://www.phmsa.dot.gov/transporting-infectious-substances/transporting-infectious-substances-overview

[95] DOT Pipeline and Hazardous Materials Safety Administration. (2020, April 2). *Packaging of Ebola Contaminated Waste.* https://www.phmsa.dot.gov/transporting-infectious-substances/packaging-ebola-contaminated-waste

[96] DOT Pipeline and Hazardous Materials Safety Administration. (2020, April 28). *COVID-19 Information.* https://www.phmsa.dot.gov/transporting-infectious-substances/covid-19-information

[97] DOT Pipeline and Hazardous Materials Safety Administration. (2020, April 2). *Infectious Substance Special Permits.* https://www.phmsa.dot.gov/transporting-infectious-substances/infectious-substance-special-permits

- Include methods to facilitate the restoration and sustainment of essential services (public and private) to maintain community functionality within plans.
- Coordinate planning for infrastructure redevelopment.
- Ensure specified timelines are included for developing, redeveloping, and enhancing community infrastructures to contribute to resilience, accessibility, and sustainability.
- Include support for strategies for systems that meet the community needs while minimizing service disruption during restoration within the specified timeline in the recovery plan.
- Communicate disruptions of critical infrastructure and the associated recovery timelines. (Refer to KPF 2: Communicate with External Partners and the Public.)

Refer To

- Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Report 769 *A Guide for Public Transportation Pandemic Planning and Response* (2014)
- American Public Transportation Association *Summary: A Guide for Public Transportation Pandemic Planning and Response (NCHRP Report 769)* (2020)
- TRB NCHRP Report 963/TCRP Report 225 *A Pandemic Playbook for Transportation Agencies* (2021)
- TRB Airport Cooperative Research Program Infectious Disease Resources webpage
- International Civil Aviation Organization Collaborative Arrangement for the Prevention and Management of Public Health Events in Civil Aviation webpage
- WHO *International Health Regulations (2005): A Guide for Public Health Emergency Contingency Planning at Designated Points of Entry* (2012)
- EPA Publications on Homeland Security Research Topics for additional information on sampling and analysis, remediation of biological contamination – including waste management, and water infrastructure incident response
- EPA *Best Practices for Management of Biocontaminated Waste* (2016)
- Healthcare Environmental Resource Center State-by-State Regulated Medical Waste Resource Locator webpage
- DHS *National Response Framework* (NRF), Emergency Support Function # 10: Oil and Hazardous Materials Response Annex (2016) for more information about EPA's role in decontamination and cleanup
- DHS Cybersecurity and Infrastructure Security Agency (CISA) Critical Infrastructure Sectors webpage; sectors were established in Presidential Policy Directive-21 (PPD-21)

What Will You Need To Know?

- ☐ Which of the 16 critical infrastructure sectors established in PPD-21 might be most impacted by a biological incident in your jurisdiction?
- ☐ How will critical infrastructure-related concerns be identified, prioritized, and coordinated?
- ☐ How will you know the status of critical infrastructures?
  - Critical infrastructure facilities?
  - Critical infrastructure workforces?
  - Critical infrastructure logistics and supply chains?
- ☐ Are there any Sector Coordinating Councils under the *National Infrastructure Protection Plan* that need to be consulted for planning?
- ☐ How will you identify and take action to address long-term supply chain logistics issues?
- ☐ What resources are available to mitigate supply chain failure?
- ☐ What are the anticipated workforce shortages? What resources are available to support resilience?
- ☐ What plans are in place to ensure equitable allocation of resources for critical infrastructure recovery?
- ☐ How will hazardous waste be managed from a long-term perspective?
  - How will you determine if there are any associated workforce, resource, or logistical issues?
  - Will any special permits be required?
  - Where are the pre-approved hazardous waste disposal sites/locations? What is their capacity?
  - What are alternative locations for hazardous waste disposal or storage?
  - What transportation limitations could prevent movement of hazardous waste between jurisdictions? What local agreements are in place?

6.2.4 ADDITIONAL RECOVERY SUPPORT FUNCTION CONSIDERATIONS

While Economic, Infrastructure Systems, and Health and Social Services RSFs potentially will be most affected by a biological incident, Housing, Community Planning and Capacity Building (CPCB), and Natural and Cultural Resources (NCR) RSFs must not be forgotten.

The Housing RSF and housing-related recovery outcomes help ensure adequate, resilient, and affordable housing is accessible to those whose housing situation was impacted by the biological incident. Housing recovery outcomes should be based on principles that are in line with and linked to existing long-term community recovery plans and processes. Large-scale biological incidents involving a contagious agent have the highest potential to require long-term housing support to

reduce transmission, mitigate impacts, and facilitate a more rapid recovery. Collaboration with public and private organizations that have experience with temporary housing, permanent housing financing, economic development, and advocacy for underserved populations should be engaged early in the planning process.

Regarding CPCB, the achievement of recovery outcomes means a resilient recovery of SLTT communities. Engagement of communities in preparedness and recovery planning leads to a more rapid recovery with buy-in for important decisions that impact the whole community. One way to increase engagement and decrease biological incident impacts is through education. Planners may develop a community education program, including concepts such as HHS CDC's One Health and global health security (prevent, detect, and respond to intentional, naturally occurring, or accidental incidents), to increase public understanding of biological incidents and their effects on the community.

Achieving recovery outcomes for the NCR RSF equates to restored, preserved, risk-resistant and resilient systems. Planners should focus on the community's natural and cultural resources and historic properties that could be impacted during a biological incident to include preparedness and mitigation strategies that are inclusive, sustainable, and resilient. Certain biological incidents may require environmental remediation activities such as water system decontamination or wildlife disease mitigation. Wildlife disease control measures will require specific natural and cultural resource considerations for environmental recovery, conservation, and historic preservation.

When planning recovery actions, planners should consider how local and regional culture will impact community engagement. Planning activities should also factor in existing inequities and disproportionate impacts on vulnerable populations and traditionally underserved elements within local communities. A large-scale biological incident will have a heavy burden on those living in multi-generational or public housing, lacking access to medical or behavioral health treatment, working in positions that must report in person without the option to telework, or depending on public transportation for mobility. Planners must account for underlying factors such as poverty and language barriers throughout community recovery efforts. Vulnerable populations should be considered and supported during every stage of response and recovery activities.

Refer To

HHS CDC One Health and Healthy Pets, Healthy People webpages for information on zoonotic diseases and related One Health issues in livestock, companion animals, and wildlife

Action Item

- Establish plans for guiding long-term activities and resource allocations that prioritize recovery objectives; facilitate equity in recovery actions through plans that help mitigate biological impacts of historically marginalized communities and vulnerable populations;

and take into account biological incident recovery plans from federal, regional, and other SLTT partners that may impact your planning.

- Ensure plans compare the restoration timeline with milestone requirements and assess whether all requirements are being met. (If all requirements are not being met, consider re-prioritization or development of alternative workarounds.)
- Continually reassess post-disaster needs for long-term housing and the available community support.
- Address affordable, accessible, and workforce housing needs in community planning efforts.
- Define a feasible timeline in community recovery plans for achieving a resilient, accessible, and sustainable housing market.
- Include ways to engage the community in recovery planning, such as through education and preparedness efforts.
- Preserve natural and cultural resources as part of an overall community recovery that is achieved through the coordinated efforts of natural and cultural resource experts and the recovery team in accordance with the specified timeline in the recovery plan.

6.3 Post-Incident Recovery Planning

Recovery and revitalization activities for some biological incidents will be so complex that existing plans may require additional stakeholder engagement to achieve recovery outcomes. Post-incident recovery planning supports a post-incident decision-making process to adapt and implement pre-incident priorities and policies. This post-incident planning allows SLTT leaders and community stakeholders to make complex, community-wide decisions for integration of public, private, and non-governmental efforts across core capabilities; set recovery goals and priorities at the community level; and manage recovery and resource allocation locally. The planning process aids community leaders in setting and communicating benchmarks to measure progress toward a community-defined successful outcome, especially in the context of long-term recovery.

In addition, long-term recovery for biological incidents presents opportunities to incorporate lessons learned from previous outbreaks or infection waves within the same incident (e.g., integration of improved communication for risk of transmission, disclosure of implementation of crisis standards of care, etc. during the COVID-19 pandemic). Lessons learned should be considered when planning to improve future response and recovery needs.

Planning, Decision-Support, and Modeling Resources for Biological Incidents

Biological incidents, whether naturally occurring (e.g., the 2003 SARS outbreak) or deliberately caused (e.g., the 2001 Amerithrax incident), may require the use of specialized resources that can assist response and recovery efforts. For example, modeling and simulation tools can help synthesize available information, provide timely analysis, and guide planning decisions at various jurisdictional levels. Modeling encompasses the engineering of a specialized tool to represent an event, while simulation is the use of the model to study a system or behavior.

Modeling and simulation tools can support SLTT planning and response activities by providing information on exposure risk, timing and location of illnesses and injuries, estimation of resources needed and their source, and other data needed to build situational awareness. Both modeling and simulation tools require inputs (e.g., incident time, population size, resources available) to provide outputs (e.g., percentage of population at risk, resources needed, POD location recommendations, Geographic Information System [GIS] maps, etc.), which emergency managers can then use for planning and decision-making. Modeling and simulation tools can also help define the geographic area in which people, animals, and the environment may be affected by a biological agent release and help estimate the population at risk.

Defining Modeling Tools

There are broad categories of models available to the emergency management community to assist in biological incident response and recovery. Infectious disease models are computational representations, frequently illustrated in either graphic and/or geographic (e.g., state, county) layouts, that forecast essential information requirements. These may include estimated incident cases (based on daily or seven-day averages) or new hospitalizations over days or weeks. Atmospheric models are also computational representations, frequently illustrated on a GIS platform, of dispersion flow of a biological agent for either indoor or outdoor venues based on meteorological conditions, particle size, release quantity, and/or other factors.

Models afford several benefits to an emergency manager. Most importantly, they can provide context to a biological incident to help inform decisions. For example, models simulating a wide-area release of weaponized anthrax in an urban area can help emergency managers identify potential areas of contamination and estimated numbers of exposed individuals based on agent release rate, source location, quantity released, weather conditions (e.g., wind, precipitation), and current census data. The same data, illustrated in a GIS platform, can also inform the selection of locations for mass care shelters, medical countermeasure dispensing/administration sites, and entry and egress to contaminated areas. Forecast models for an active outbreak or emerging infectious disease can inform estimates of resource needs or anticipated requests for medical countermeasures and the locations where such demand is or will likely be high.

Interagency Modeling and Atmospheric Assessment Center (IMAAC)

IMAAC's Technical Operation Hub (DoD Defense Threat Reduction Agency [DTRA]), in collaboration with HHS, has modeling capabilities to support response and recovery efforts during a biological incident using its Hazard Prediction and Assessment Capability (HPAC). HPAC considers weather conditions to calculate the transport of an agent through the outdoor environment and estimate consequences of the release, such as areas contaminated, doses received by people in the affected area, and the likely numbers of injured, ill, and/or dead inhabitants.

Model and Data Inventory (MoDI)

MoDI is a collection of available data and monitoring resources developed for the Emergency Support Function Leadership Group. The MoDI inventory was informed by a comprehensive analysis of data and models used to support emergency management decision-making for floods, hurricanes, earthquakes, biological scenarios, and nuclear detonation scenarios. Online data can be filtered to call out the specific tools and datasets applicable to biological incidents (either bioterrorism or a naturally occurring disease outbreak).

Modeling and Simulation Uses and Limitations

Various types of planning and response tools are available to assist planners and decision makers during biological incident response and recovery. Some models and simulations are easy to use, accessible to everyone, and designed for use at the local level. Other resources are more sophisticated, require specialized data sources, SMEs to access or interpret, and are not readily available at the local or regional level. These capabilities are accessed through reach back to federal agencies or SMEs.

In all cases, planners must understand the data requirements and specific purposes for which the models were designed and how these limit the ability to use the data outputs. Atmospheric models, for example, cannot accurately predict cross-contamination or the spread of biological agents outside the identified geographic areas of concern. In addition, such models cannot accurately predict biological agent runoff, due to precipitation and/or decontamination efforts, into nearby surface water systems.[98] Infectious disease models forecasting new cases or hospitalizations are challenged by social factors such as communities or individuals implementing NPIs (e.g., social distancing, staying home from social venues), or conversely, behaviors that increase risk (e.g., increased travel particularly during weekends or holidays). They also cannot forecast emerging variants of a biological agent, which may result in either increased or decreased rates of transmissibility, virulence, or MCM effectiveness.

[98] There are surface water modeling tools for CBRN agents, but their use is complicated by multiple sources (e.g., runoffs) versus single source release.

Furthermore, models can only generate outputs based on the quality of corresponding data inputs. Sharing of new incident data as it becomes available is critical to ensuring modeling estimates are refined, updated, and able to provide the best possible information to support decision-making. In the early phases of a biological incident, a planner may not have timely, accurate input data. (Refer to KPF 1: Detect and Characterize the Threat for more information on data collection and limitations.) Incomplete or limited data may result in models and simulations providing highly inaccurate results that should be regarded with some degree of skepticism, especially during the initial response phase of a biological incident. However, as more is known about an incident, models generally provide more refined outputs to better guide decision-making in response and recovery.

Modeling and simulation tools included in Table 5 below can be used by planners to help their jurisdictions respond to and recover from biological incidents. This list of modeling and simulation tools, decision support tools, and databases is not intended to be comprehensive, but rather is intended as a starting point for planners seeking resources to facilitate key functions and decision-making during biological incident response and recovery. Planners should begin by assessing the tools that are already in use in their jurisdictions.

Refer To

- FEMA Model and Data Inventory (MoDI) for more information about federal modeling and simulation resources
- FEMA Interagency Modeling and Atmospheric Assessment Center webpage for more information
- HHS ASPR Tools & Technical Assistance webpage provides information on additional tools, technical assistance, and training available to planners.

Coordination Opportunity

Collaborate with local, state, or federal public health officials to identify modeling and simulation tools that can support your jurisdiction or that are already being used to monitor biological incidents. Work with local HCCs and public health authorities to coordinate data access and integration into modeling and simulation tools.

Collaborate with academic institutions, centers of excellence, and government agencies to leverage existing resources and develop appropriate modeling to help inform decision makers during biological incident response and recovery.

Coordinate with modeling resource centers, such as IMAAC, to understand what tools are available for use in your jurisdiction. A single point of contact can be leveraged for access to multiple models or resources.

Action Item

Understand your organization's in-house capacity for modeling and simulation.

- Will you have sufficient resources (qualified personnel on staff, appropriate IT infrastructure, etc.) to support running models in-house?
- Will you need to partner with outside organizations for modeling and simulation?
- Does your staff understand the limitations of the model and what it cannot inform?

Identify which tools are best suited for the scenarios that are most likely in your jurisdiction, which tools are already in use in your jurisdiction, and which tools you are likely to use.

- Familiarize planners and responders with CBRNResponder tool.
- Connect with academic resources within your jurisdiction.
- Contact IMAAC for more advanced modeling at imaac@fema.dhs.gov or 1-877-240-1187.

Select models that are appropriate to estimate the impact of the threat(s) of concern for your jurisdiction.

- Run simulations with varying input parameters to test out the variability and sensitivity of the results to uncertainties in the input data.
- Be prepared to rerun models to help inform decisions as the incident progresses and more data becomes available.
- Run models and simulations, including during planned exercise activities, to ensure expected outputs align with planned use.

Identify local, real-world data sources (e.g., syndromic surveillance, hospital capacity) that will provide the latest available information necessary to populate selected models.

- How will you collect and pre-position accurate and timely local data that will be needed for modeling and simulation?
- If current information will not be readily available, what method will you establish to obtain the required information?
- If required, establish accounts with any national databases that will be needed.

What Will You Need To Know?

☐ When will you need to use modeling and simulation tools? Consider all aspects of biological incident response and recovery:

- Atmospheric dispersion event characterization and consequence analysis
- Estimates of outpatient visits, hospitalizations, and deaths for a respiratory pandemic
- Syndromic surveillance

- Routing vehicle fleets to optimize delivery of MCMs/SNS/PODs
- Flow of persons through PODs
- Regional spread of infectious disease
- Situational awareness, assessment, and management of resources
- Location and availability of critical pharmaceuticals and local supplies

☐ What planning, decision support, and modeling resources are available to you?

- Which are best suited for the risks identified in your jurisdiction?
- Which tools are already in use in your jurisdiction?
- Are such tools integrated into your response planning?
- Which tools are likely to be used following an incident?

☐ Which FSLTT partners can support optimization of shared and available resources?

- For what purpose are models and simulations run by a partner organization? When? Are models and simulations automatically run as part of their protocols? If not, what triggers models and simulations into action?
- Can models and simulations be accessed by other FSLTT stakeholders?

☐ Which data will be needed from you to run a partner organization's tools?

- How will it be provided? What agreements between organizations must be put in place prior to a biological incident to facilitate data-sharing and confidentiality?
- How will you access current data on available medical resources (e.g., hospital beds, supplies, equipment, medical/public health personnel)?
- Where will you obtain access to the latest population demographic data (if not built into the tool), inventories of available resources, and response impacts?
- How will you update the relevant information—either as the input datasets for models run locally or in the request for model runs by supporting partners?

☐ How will model results be reported and to whom?

- How will model outputs be packaged and presented for decision makers?
- How will the incorporation of the evolving results change as response unfolds?
- Who will interpret the results? Public health or emergency management?
- What local SMEs will be available to help clarify data and advise?
- Who will act on the results?

Table 5: Planning, Response, and Decision Support Tools—Operations and Response Management

Tool	Capabilities	Support Type	Timeline
GeoHEALTH Platform [HHS]	A secure, GIS-based, electronic, and interactive mapping application that provides enhanced situational awareness, assessment, and management of resources for pandemic and man-made events. Click here for more information on the GeoHEALTH Platform.	Planning, Response, and Recovery	Data continuously updated over internet
HHS emPOWER Map [HHS]	A map that provides monthly updated de-identified totals at the national, state, territorial, county, and zip code level for Medicare beneficiaries reliant on electricity-dependent medical and assistive equipment and devices who can be threatened by severe weather or other emergencies. This information helps communities to better anticipate, plan for, and address the potential needs of these at-risk individuals who may rapidly need assistance in the event of an incident, emergency, or disaster. Click here for more information on HHS emPOWER Map. Access HHS emPOWER Map here.	Planning	Data updated monthly
Inventory Management and Tracking System (IMATS) [HHS ASPR]	A system that allows planners and responders to manage the large and moving MCM inventory received from the SNS. Capabilities include the ability to track MCM inventory down to local levels; support warehouse operations; monitor reorder thresholds; record counts for dispensed MCMs; monitor operations status through a comprehensive dashboard; run reports and extracts for inventory counts and transaction data; create custom roles for users; import existing data on facilities, storage locations, products, etc.; and collect data from local jurisdictions, aggregate, and report inventory totals. Click here for more information on IMATS. Contact the IMATS help desk at imatshelp@cdc.gov for system access.	Response and Recovery	Immediate predictions once baseline data is entered

Tool	Capabilities	Support Type	Timeline
Community Flu 2.0 [HHS CDC]	A software program that simulates the spread of influenza through a model community and the impact of a variety of potential interventions (e.g., vaccinations, school closings, wearing of face masks, patient and household isolation/self-quarantine). Click here for more information on Community Flu 2.0. Download the Community Flu 2.0 tool here.	Planning	Less than 5 minutes to run simulations
FluAid 2.0 [HHS CDC]	A custom, stand-alone application that provides estimates of the total numbers of deaths, hospitalizations, and outpatient visits for an influenza pandemic (before interventions are applied). Results are limited to influenza and should be treated as general guidelines only. Click here for more information on FluAid 2.0. Download the FluAid 2.0 tool here.	Planning	Immediate predictions once baseline data is entered
FluSurge 2.0 [HHS CDC]	A macro-enabled, Microsoft Excel spreadsheet that estimates the impact of an influenza pandemic on the demand for hospital-based services. Results are limited specifically to influenza and should be treated as general guidelines only to allow identification of the approximate resources that may be required. Click here for more information on FluSurge 2.0. Download the FluSurge 2.0 tool here.	Planning	Immediate predictions once baseline data is entered
MedCon: Pre-Event [HHS CDC]	A software tool designed to estimate the baseline medical care requirements of a displaced population (per 100,000 unit of population) with pre-existing medical conditions following a disaster (e.g., terrorism or natural phenomenon). Click here for more information on MedCon: Pre-Event. Download the MedCon Pre-Event tool here.	Planning and Response	Immediate predictions once baseline data is entered

Tool	Capabilities	Support Type	Timeline
PanVax **[HHS CDC]**	A Microsoft Excel-based instrument that guides jurisdictional planning and outreach efforts during pre-incident preparedness activities. The tool helps local planners understand how their vaccine providers (i.e., pharmacies, clinics, hospitals, employers, schools, points of dispensing) might contribute to the community's vaccination response during a severe pandemic. The tool provides information regarding how to allocate pandemic vaccine doses to each provider group. Click here for more information on PanVax. Download the PanVax tool here.	Planning, Response, and Recovery	Immediate predictions once baseline data is entered
Maxi-Vac Programs [HHS CDC]	Microsoft Excel-based tools (Maxi-Vac 1.0 & Maxi-Vac Alternative) that can be used by state and local public health officials to plan large-scale smallpox vaccination clinics and optimize staff allocation to maximize the number of patients who can be vaccinated during a 12-hour shift. Click here for more information on Maxi-Vac Programs. Access the Maxi-Vac tools here.	Planning and Response	Immediate predictions once baseline data is entered
HHS CDC/ATSDR Social Vulnerability Index (SVI) **[HHS CDC]**	A database and map that uses U.S. census data to determine social vulnerability of a population through 15 social factor variables, such as poverty, lack of vehicle access, and crowded housing, to help local officials identify communities that may need support before, during, or after disasters. Click here for more information on the HHS CDC/ATSDR SVI. Download HHS CDC/ATSDR SVI data and documentation here.	Planning, Response, and Recovery	Immediate but dependent on census data availability

Tool	Capabilities	Support Type	Timeline
Community Assessment for Public Health Emergency Response (CASPER) **[HHS CDC]**	A type of rapid needs assessment designed to provide household-level information to public health leaders and emergency managers for their use in initiating public health action; identifying information gaps; facilitating disaster planning, response, and recovery activities; allocating resources; and assessing new or changing needs in the community. This assessment represents a cross-sectional epidemiologic design and is not to be used as a surveillance tool. Click here for more information on CASPER. Access the CASPER tool here.	Planning, Response, and Recovery	Assessment tools are available to download and use immediately
Point of Dispensing Simulation Program for Leveraging and Evaluating Resources (POD SimPLER) **[HHS CDC]**	A web-based software that helps public health planners estimate their current or projected population throughput capacity, identify potential processing bottlenecks, and determine resource needs when planning for MCM dispensing or administration operations during an actual emergency or training event. This software can be used to assess staffing capacity for existing sites aiming to expand or modify their operations, as a validation or training tool for locations forming vaccination or dispensing plans, or as a precursor or accompanying tool for use during full-scale exercises. Click here for more information on POD SimPLER. Access the POD SimPLER tool here.	Planning and Response	Immediate estimations once baseline data is entered
BioSense Platform **[HHS CDC]**	A secure, cloud-based, and integrated electronic health information platform designed for users to rapidly collect, evaluate, share, and store syndromic surveillance data through the use of standardized analytic tools as early as 24 hours after a patient's visit to a participating facility. Click here for more information on the BioSense Platform. Contact nssp@cdc.gov for access.	Response and Recovery	24 hours after data is entered

Tool	Capabilities	Support Type	Timeline
Anthrax Assist **[HHS CDC]**	A Microsoft Excel-based modeling tool that allows a user to combine initial anthrax case reports and potential effects of variable PEP campaigns to project hospitalizations and casualties. Download the Anthrax Assist tool here.	Planning and Response	Immediate estimations once baseline data is entered
National Biosurveillance Integration Center (NBIC) Reports **[DHS]**	A center that provides daily reports on the status of diseases such as SARS-CoV-2 (COVID-19), enterovirus, the flu, Middle East Respiratory Syndrome (MERS), and Ebola. NBIC also produces periodic analytic reports on special topics and events, and it enables early warning and shared situational awareness of acute biological events. NBIC offers near real-time data integration capability that pulls information from a variety of sources, performs analysis of the data, and shares the results with FSLTT stakeholders. Contact CWMD.NBIC@hq.dhs.gov for reports.	Response	Daily updates, and special reports as requested
Interagency Modeling and Atmospheric Assessment Center (IMAAC) **[FEMA]**	A center that provides federal atmospheric dispersion event characterization and consequence analysis for a full range of aerosolized CBRN threats. IMAAC can support postulated "what-if" scenario excursions. Click here for more information on IMAAC. Contact imaac@fema.dhs.gov for more information and call 1-877-240-1187 to request activation.	Planning, Response, and Recovery	Initial IMAAC products are distributed within 30 minutes of request

Tool	Capabilities	Support Type	Timeline
Comprehensive National Incident Management System (CNIMS) **[DoD DTRA]**	A set of tools to model regional spread of non-vector-borne infectious diseases and provide detailed, agent-based simulation of the U.S. population. Tools can model a variety of scenarios with and without planned response measures/interventions. This sophisticated epidemiological modeling capability requires a long lead time and can only be accessed through the National Guard's Weapons of Mass Destruction (WMD) Civil Support Teams (CST) or FEMA Regional authorities. DTRA's Joint Operations Center (JOC) has existing MOUs with the National Guard Bureau (to support National Guard WMD-CST) and with DHS (FEMA) (to support federal planners). Authorized requestors can contact the JOC (703-767-2003 or by email to DTRA-SCC-JOC@mail.mil) to request a run.	Planning and Response	Approx. 12 hours for large-scale simulation (millions of people); faster for smaller scale runs
PatchSim **[University of Virginia, DoD DTRA]**	A model that maps human mobility via metapopulations or "patches" of individuals in various disease states and their movement between patches (which can represent localities in areas being modeled). Access the PatchSim tool here.	Planning and Response	Immediate predictions once data is entered
EpiGrid **[DOE]**	A medium-grained, geographically resolved model that is based on differential equation–type simulations of disease and epidemic progression in the presence of various human interventions geared toward understanding the role of infection control, early versus late diagnosis, vaccination, etc. in outbreak control. Contact DoD DTRA for tool access and more information.	Planning and Response	Immediate predictions once data is entered

Tool	Capabilities	Support Type	Timeline
Trade-off Tool for Sampling (TOTS) **[EPA]**	A web-based tool that allows users to create sampling designs and estimate the associated resource demand through an interactive, point-and-click interface for developing biological sampling plans. TOTS estimates the total time and cost necessary for implementation, which includes sampling kit preparation, conducting the sampling campaign, and lab analysis. Click here for more information on TOTS. Access TOTS here.	Planning	Immediate predictions once data is entered
Waste Storage and Staging Site Selection Tool **[EPA]**	An all-hazards tool that provides a framework for conducting a site selection suitability analysis to identify and rank potential locations for staging and storing waste. Click here for more information on the Waste Storage and Staging Site Selection Tool. Access the Waste Storage and Staging Site Selection Tool here.	Response and Recovery	Immediate predictions once data is entered
Incident Waste Decision Support Tool (I-WASTE DST) **[EPA]**	A tool that allows planners, emergency responders, and other individuals responsible for making disposal decisions to access technical information, regulations, and guidance and work through important disposal issues to assure safe and efficient removal, transport, treatment, and/or disposal of debris and waste materials. Waste Materials Estimator generates the order of magnitude estimates for the types and quantities of materials that may require decontamination and/or disposal from one or more structure types. Click here for more information on I-WASTE DST.	Planning, Response and Recovery	Immediate predictions once data is entered
Waste Management Planning (WMP) Tool **[EPA]**	A tool that assists emergency managers and planners in creating or updating a comprehensive plan for managing waste generated from man-made and natural disasters. The tool walks the user through the process of developing and implementing a plan. Click here for more information on the WMP Tool.	Planning	Immediate predictions once data is entered

Tool	Capabilities	Support Type	Timeline
Waste Estimation Support Tool (WEST) **[EPA]**	A tool that assists emergency planners, responders, and decision makers in analyzing remediation strategies and associated waste management impacts of biological and radiological remediation. The tool provides first order magnitude estimates of waste to illuminate how waste estimates change among decontamination/remediation approaches considered, and it uses geospatial data to assist in defining the extent of contamination in specified areas. Click here for more information on WEST. Access WEST here.	Response and Recovery	Immediate predictions once data is entered
Suite for Automated Global Electronic bioSurveillance (SAGES) **[John Hopkins Applied Physics Laboratory]**	A collection of modular, flexible, freely available software tools for electronic disease surveillance in resource-limited settings. Builds upon the DoD-sponsored Electronic Surveillance System for Early Notification of Community-based Epidemics (ESSENCE) syndromic surveillance system. Detects outbreaks and alerts public health personnel. Applies syndrome definitions, statistical algorithms to identify possible outbreaks in medical encounter data. Click here for more information on SAGES. Download the SAGES tool here.	Response	Once system is set up and dashboard configuration established, updates are continuous as additional data is collected

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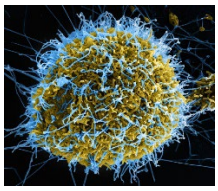

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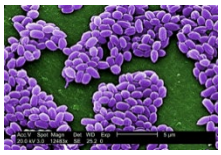

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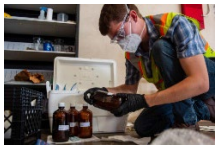

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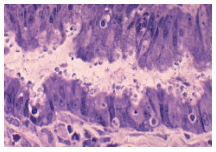

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Appendix A: Examples of National-Level Notification Modalities

Information-Sharing Process	Description
Biological Incident Notification and Assessment (BINA) Protocol	Provides a consistent means for NSC staff to convene agencies pursuant to the interagency policy process outlined in National Security Memorandum (NSM)-2. This process allows the federal government the ability to rapidly develop a common understanding of an evolving, potentially high-consequence biological incident or threat, allowing for rapid decision-making and coordinated action among agencies and as directed by the President.
BioWatch National Conference Call	Occurs within 2 hours of the BioWatch Actionable Result declaration and after the local jurisdictional BioWatch Advisory Committee (BAC) call. It begins with a summary of laboratory testing data and the current local situation by the BAC chair and other local public health, law enforcement, and emergency management representatives to provide situational awareness of follow-on activities and potential requests for assistance from other federal agencies (DHS, HHS CDC, DOJ FBI, EPA, or the Strategic National Stockpile [SNS]). It also provides information regarding the next conference call time.
National Biosurveillance Integration System (NBIS) Protocol	Mechanism to bring federal NBIS partners together on a short-notice teleconference to share information on a potentially significant biological incident. It can be initiated at the request of any NBIS partner and is an example of a unique capability of the National Biosurveillance Integration Center (NBIC) that helps enable national biosurveillance integration. The protocol is activated when a situation meets one or more of the threshold criteria and is requested by an NBIS agency.
Health Alert Network (HAN)	The HHS CDC's primary method of sharing public health information with public information officers, federal and SLTT-area public health practitioners, clinicians, and public health laboratories. There are jurisdictional HAN programs from 50 states, the District of Columbia, and eight territories, as well as the metropolitan areas of Chicago, Los Angeles, and New York City.
Epidemic Information Exchange (Epi-X)	A web-based communications solution for public health professionals. Through Epi-X, HHS CDC officials, state and local health departments, poison control centers, and other public health professionals can access and share preliminary health surveillance information—quickly and securely. Users can also be actively notified of breaking health events as they occur. Key features of Epi-X include unparalleled scientific and editorial support, controlled user access, digital credentials and authentication, rapid outbreak reporting, and peer-to-peer consultation.
Clinician Outreach and Communication Activity (COCA)	Provides timely, accurate, and credible information to clinicians related to emergency preparedness and response and emerging public health threats. COCA fosters partnerships with national clinician organizations to strengthen information-sharing networks before, during, and after a public health emergency.

Information-Sharing Process	Description
HHS Public Affairs Conference Line (PACL)	Provides a conference line to allow telephone connectivity for public affairs staff supporting ESF #8. This conference line allows HHS public affairs personnel to work from dispersed sites during the crisis while receiving guidance or direction or providing information to those who need it.
National Incident Coordination Conference Line (NICCL)	While DHS traditionally leads the NICCL for transmission and exchange of critical and timely incident information among federal authorities, HHS, when needed, can coordinate communications information related to the public health and medical aspects of a response, particularly in a public health-specific emergency such as a pandemic disease. DHS coordinates similar processes for private and state entities through the Private Sector Incident Coordination Conference Line (PICCL) and State Incident Coordination Conference Line (SICCL), respectively.
National Public Health Information Coalition (NPHIC)	Leverages a network of state and local public health communicators to exchange information and facilitate consistent messaging and communication activities between federal and SLTT-area governments regarding the emergency and its impact on health.
National Animal Health Laboratory Network (NAHLN)	A nationally coordinated network and partnership of federal, state, and university-associated animal health laboratories. NAHLN veterinary diagnostic laboratories provide animal health diagnostic testing to detect biological threats to the nation's food animals, thus protecting animal health, public health, and the nation's food supply. These laboratories also provide the capability to diagnose both endemic and foreign high-consequence livestock pathogens in animals and environmental samples and are likely to be the first-line laboratories for recognition of an intentionally or accidentally introduced agent in animals. The National Veterinary Services Laboratories (NVSL) serve as the nation's reference laboratories for both the NAHLN and USDA.
National Veterinary Services Laboratories (NVSL)	Located in Ames, Iowa, and Plum Island, New York, the NVSL helps safeguard U.S. animal health and contributes to public health by ensuring that timely and accurate laboratory support is provided via its nationwide animal-health diagnostic system. NVSL provides diagnostic services, reagents, and training in world-class facilities; facilitates response to animal health emergencies; manages NAHLN; serves as an international reference laboratory; and maintains a well-trained and responsive staff.
National Animal Health Monitoring System (NAHMS)	Collects, analyzes, and disseminates data on animal health, management, and productivity across the U.S. The NAHMS team also conducts national studies on the health and health management of U.S. domestic livestock populations to meet the information needs of the industries associated with these commodities, as identified by people within those industries.
National Animal Health Surveillance System (NAHSS)	An interdisciplinary network of partners working together to protect animal health and promote trade through surveillance, control, and prevention of foreign, emerging, zoonotic, and endemic diseases. The NAHSS infrastructure also provides the tools necessary to detect chemical or environmental agents that could affect animal health.

Information-Sharing Process	Description
National Outbreak Reporting System (NORS)	A web-based platform used by SLTT health departments in the U.S. to report all waterborne and foodborne disease outbreaks and enteric disease outbreaks transmitted by contact with environmental sources, infected persons or animals, or unknown modes of transmission to HHS CDC.

Initial notifications related to intentional biological threats and incidents, including those within the scope of National Security Presidential Memorandum (NSPM) - 36, Guidelines for USG Interagency Response to Terrorist Threats or Incidents in the United States and Overseas (January 19, 2021), are further outlined and referenced in the Branch 1 Plan (Intentional Biological Incidents) to the BIA (currently under revision).

Figure 43: Common operating picture for biological incidents

Appendix B: Examples of a Biological Pathogen Detection, Verification, and Information Sharing

Information Sources	Examples of Initial Intelligence Received	Verification Process	Methods of Information Sharing
Individual practitioner or healthcare facility lab	Suspected or confirmed sentinel case reported through local public health	Private sector, Laboratory Response Network (LRN), or HHS CDC laboratory confirmation may be required	Health Alert Network (HAN), National Public Health Information Coalition (NPHIC), Clinician Outreach and Communication Activity (COCA)
Individual facility, local or state health department surveillance systems	Influx of patients with similar symptoms indicating potential new disease pathogen	Private sector, LRN, or HHS CDC laboratory confirmation may be required Epidemiologic investigation to confirm patterns of similarity	HAN, National Incident Coordination Conference Line (NICCL), COCA, National Poison Data System
Identification of novel or atypical pathogen in FSLTT, or private sector laboratory	Individual not originally suspected; "unexpected" diagnosis received through secondary testing	Private sector, LRN, or HHS CDC laboratory confirmation may be required	HAN, COCA, NPHIC, Public Affairs Conference Line (PACL), NBIS Protocol
Novel emerging infection reported under IHR from overseas source	New pathogen or pathogen of concern evolving in a situation in which spread to U.S. is possible	Multiple international partners as well as international assistance provided by U.S. Government (USG)	HAN, COCA, NPHIC, PACL, National Biosurveillance Integration System (NBIS) Protocol
Zoonotic outbreak identified by private sector, SLTT, or federal providers or laboratories	Zoonotic pathogen identified in an animal population with potential for causing human disease	USDA, HHS CDC, SLTT, National Animal Health Laboratory Network (NAHLN), or private sector laboratory confirm all possible	HAN, COCA, NPHIC, PACL, NBIS Protocol
Law enforcement intelligence	Credible threat of deployment of pathogen of concern	Law enforcement investigations paired with public health expertise	Law Enforcement Sensitive (LES) Bulletin, NSC Process, NICCL

Information Sources	Examples of Initial Intelligence Received	Verification Process	Methods of Information Sharing
Public media	Announced release of pathogen of concern	Multiple entities/processes at various levels potentially involved	NSC Process, NICCL, follow-on HAN, NPHIC, PACL

Appendix C: Funding Sources for Stafford and Non-Stafford Incidents

	Types of Funding	Administered by	Description
Public Health Emergency Fund (PHEF)	Supplemental appropriations can be sought from Congress	HHS	The PHEF is a no-year fund at the U.S. Treasury to provide funding in the event of a public health emergency. The PHEF has no balance and can only be accessed in a declared public health emergency. In addition, there are no other immediate and flexible no-year funding sources available to ensure a timely response to an urgent event and no such fund for an event that does not meet the threshold for a public health emergency declaration.
Non-Stafford Act	Appropriated Funds	Each Department/ Agency	As established by Congress. (Most federal agencies do not have disaster response appropriations and specific guidance from agency financial management offices should be obtained).
Non-Stafford Act	Economy Act, 31 U.S.C. 1535-1536: Federal-to-Federal	DHS	A federal entity with primary responsibility and statutory authority for handling an incident (i.e., the requesting agency) that needs support beyond its normal operations may request DHS coordination and facilitation through the National Response Framework (NRF).
Non-Stafford Act	Public Health Emergency Preparedness (PHEP) Cooperative Agreement	HHS CDC	HHS CDC provides SLTTs with funding and technical assistance to build public health preparedness and response capabilities nationwide. PHEP Cooperative Agreement provides funding to 50 states, four cities, and eight U.S. territories and freely associated states.

	Types of Funding	Administered by	Description
Stafford Act	Pandemic Coverage: (Emergency Assistance for Human Influenza Pandemic Disaster Assistance Policy 9523.17. November 25, 2009)	FEMA	Direct federal assistance is available through Public Assistance grants for Stafford Act declarations related to pandemic influenza. Assistance provided by FEMA under the Stafford Act in response to a pandemic influenza declaration may not duplicate assistance provided or available under the authority of other federal agencies, including HHS.
Stafford Act	Mutual Aid Agreements for Public Assistance and Fire Management Assistance Disaster Assistance Policy 9523.6. August 13, 2007	FEMA	FEMA will reimburse for services provided through written mutual aid agreements, such as the Emergency Management Assistance Compact (EMAC), for aid provided to states where there has been a Presidential declaration, the activities and costs directly relate to the incident and eligible work, and costs are reasonable.
Stafford Act	Disaster Relief Fund (Robert T. Stafford Relief and Emergency Assistance Act of 1988)	FEMA	Disaster relief funding limits established by Congress.

Appendix D: Support Functions

Emergency Support Functions (ESFs)

ESFs provide the structure for coordinating federal interagency support for a federal response to an incident. ESFs serve as a means of grouping functions that provide federal support to states and federal-to-federal support, both for Stafford Act declared disasters and emergencies and for non-Stafford Act incidents.

Emergency Support Function	Purpose
ESF #1 – Transportation	Provides support by assisting SLTT, insular area, federal governmental entities, voluntary organizations, non-governmental organizations (NGOs), and the private sector in the management of transportation systems and infrastructure during domestic threats or in response to actual or potential incidents.
ESF #2 – Communications	Supports the restoration of communications infrastructure, coordinates communications support to response efforts, facilitates the delivery of information to emergency management decision makers, and assists in the stabilization and reestablishment of systems and applications during incidents.
ESF #3 – Public Works and Engineering	Coordinates and organizes the resources of the federal government to facilitate the delivery of multiple core capabilities.
ESF #4 – Firefighting	Provides federal support for the detection and suppression of wildland, rural, and urban fires resulting from, or occurring coincidentally with, an all-hazard incident requiring a coordinated national response for assistance.
ESF #5 — Information and Planning	Collects, analyzes, processes, and disseminates information about a potential or actual incident, and conducts deliberate and crisis action planning activities to facilitate the overall activities in providing assistance to the whole community.
ESF #6 – Mass Care, Emergency Assistance, Temporary Housing, and Human Services	Coordinates and provides life-sustaining resources, essential services, and statutory programs when the needs of disaster survivors exceed SLTT and insular area government capabilities.
ESF #7 – Logistics	Integrates whole community logistics incident planning and support for timely and efficient delivery of supplies, equipment, services, and facilities. It also facilitates comprehensive logistics planning, technical assistance, training, education, exercise, incident response, and sustainment that leverage the capability and resources of federal logistics partners, public and private stakeholders, and NGOs in support of both responders and disaster survivors.

Emergency Support Function	Purpose
ESF #8 – Public Health and Medical Services	Provides the mechanism for federal assistance to supplement SLTT and insular area resources in response to a disaster, emergency, or incident that may lead to a public health, medical, behavioral, or human service emergency, including those that have international implications.
ESF #9 – Search and Rescue (SAR)	Deploys federal SAR resources to provide lifesaving assistance to SLTT and insular area authorities, including local SAR coordinators and mission coordinators, when there is an actual or anticipated request for federal SAR assistance.
ESF #10 – Oil and Hazardous Materials Response	Provides federal support in response to an actual or potential discharge and/or release of oil or hazardous materials when activated.
ESF #11 – Agriculture and Natural Resources	Organizes and coordinates federal support for the protection of the nation's agricultural and natural and cultural resources during national emergencies. ESF #11 works during actual and potential incidents to provide nutrition assistance; respond to animal and agricultural health issues; provide technical expertise, coordination, and support of animal and agricultural emergency management; ensure the safety and defense of the nation's supply of meat, poultry, and processed egg products; and ensure the protection of natural and cultural resources and historic properties.
ESF #12 – Energy	Provides support to the DHS by assisting FSLTT government entities, NGOs, and the private sector through coordination of government capabilities, services, technical assistance, and engineering expertise during disasters and incidents that require a coordinated federal response. The term "energy" includes producing, storing, refining, transporting, generating, transmitting, conserving, building, distributing, maintaining, and controlling energy systems and system components.
ESF #13 – Public Safety and Security	Provides federal public safety and security assistance to FSLTT organizations overwhelmed by the results of an actual or anticipated natural/man-made disaster or an act of terrorism.
ESF #14 - Cross-Sector Business and Infrastructure	Supports the coordination of cross-sector operations, including stabilization of key supply chains and community lifelines, among infrastructure owners and operators, businesses, and their government partners.
ESF #15 – External Affairs	Provides accurate, coordinated, timely, and accessible information to affected audiences, including governments, media, the private sector, and the local populace, including children; those with disabilities and others with access and functional needs; and individuals with limited English proficiency.

Recovery Support Functions (RSFs)

In the recovery phase of incident management, the RSFs support local governments by facilitating problem solving, improving access to resources, and fostering coordination among state and federal agencies, non-governmental partners, and stakeholders.

Recovery Support Function	Coordinating Agency	Purpose
Community Planning and Capacity Building (CPCB)	FEMA	Supports the needs of impacted SLTT governments' ability to plan for, engage the community, and build capacity through planning technical assistance, program support, or funding for planning and capacity building-related initiatives.
Economic	U.S. Department of Commerce (DOC)	Supports SLTT governments and the private sector to sustain and/or rebuild businesses, foster employment, and develop economic opportunities that result in sustainable and economically resilient communities after an incident.
Health and Social Services	HHS	Supports SLTT recovery efforts to address public health, healthcare facilities and coalitions, and essential social services needs for at-risk and vulnerable children, individuals, and families displaced by an incident or disaster.
Housing	U.S. Department of Housing and Urban Development (HUD)	Coordinates and facilitates the delivery of federal resources to implement housing solutions supporting the needs of the whole community, contributing to sustainability and resilience.
Infrastructure Systems	U.S. Army Corps of Engineers (USACE)	Facilitates the restoration of infrastructure systems and services through funding and technical assistance to support a viable, sustainable community and improve resilience to and protection from future hazards.
Natural & Cultural Resources	U.S. Department of Interior (DOI)	Facilitates the integration of federal capabilities to support the protection of natural and cultural resources and historic properties through appropriate response and recovery actions to preserve, conserve, rehabilitate, and restore according to post-disaster community priorities and in compliance with applicable environmental and historical preservation laws and executive orders.

Appendix E: Federal Assets for Chemical, Biological, Radiological, and Nuclear (CBRN) Incidents

Department of Homeland Security Assets for CBRN Incidents

Asset	Dept./Agency	Description
Incident Management Assistance Teams (IMAT)	FEMA	Provide on-scene incident command capabilities and identify and satisfy initial requirements for federal assistance. Serve in core responsibilities in Incident Command System (ICS) structure for federal assistance to local disasters and for federally led incidents.
Urban Search & Rescue (US&R) Teams	FEMA	Provide specialized assistance locating and rescuing victims after buildings or other structures collapse, or in response to natural hazards such as landslides or earthquakes.
Consequence Management Coordination Unit (CMCU)	FEMA	Ensures information sharing and coordination between DOJ FBI-led Protection and Prevention operations and FEMA-coordinated consequence management Response operations.
Visible Intermodal Prevention and Response (VIPR) Teams	Transportation Security Administration (TSA)	Deploys transportation security assets (e.g., security inspectors, air marshals, and canine teams) to specific locations and events as needed.
Protective Security Advisors (PSAs)	DHS Cybersecurity and Infrastructure Security Agency (CISA)	Anticipate and assess damage to the area's critical infrastructure assets, including assessing the potential for cascading effects due to interdependencies among those assets. Also help prioritize re-entry and recovery efforts related to critical infrastructure.

Asset	Dept./Agency	Description
National Response System (NRS)	U.S. Coast Guard (USCG) and EPA	Coordinates federal actions and deployment of federal assets to respond to discharges of oil into U.S. waters and adjoining shorelines, and releases of hazardous substances, pollutants, or contaminants into the environment.

Department of Health and Human Services Assets for CBRN Incidents

Asset	Dept./Agency	Description
U.S. Public Health Service Commissioned Corps	Assistant Secretary for Health (ASH)	Provides medical and public health workforce surge capacity in response to mass casualty incidents and other public health emergencies.
Strategic National Stockpile (SNS)	HHS ASPR	Provides medicine and medical supplies when a public health emergency has overwhelmed local supplies. Also contains unique supplies to respond to certain CBRN agents.
International Medical Surgical Response Team (IMSURT)	HHS ASPR, National Disaster Medical System (NDMS)	Deployed at the request of the Department of State (DOS) to treat U.S. citizens injured as a result of terrorism, consisting of 50 members with flexible and mobile equipment, supplies, and pharmaceuticals.
National Veterinary Response Team (NVRT)	HHS ASPR, NDMS	Provides expert veterinary care treating ill or injured pets, companion animals, service animals, working animals (including security animals), laboratory animals, and livestock impacted by natural and technological disasters, acts of terrorism, disease outbreaks, and during certain national special security events. NVRTs also provide veterinary health screening at points of embarkation and debarkation for any animals and conduct environmental and zoonotic disease assessments.
Disaster Medical Assistance Team (DMAT)	HHS ASPR, NDMS	Provides medical care at a fixed or temporary medical care site. Special teams include pharmacy, nurse, burn, pediatric, crush, and mental health.

Asset	Dept./Agency	Description
Disaster Mortuary Operational Response Team (DMORT)	HHS ASPR, NDMS	Provides temporary morgue facilities, victim identification, forensic dental pathology, forensic anthropology, processing, preparation and disposition of remains.
National Medical Response Team (NMRT)	HHS ASPR, NDMS	Provides mass decontamination, medical triage, and primary and secondary medical care to stabilize victims for transportation to tertiary care facilities in a hazardous material environment.
Trauma and Critical Care Teams (TCCTs)	HHS ASPR, NDMS	Provide critical, operative, and emergency care to help people in the wake of natural and man-made disasters and public health emergencies. TCCT members are medical professionals deployed at the request of local authorities to supplement FSLTT resources.
Laboratory Response Network (LRN)	HHS CDC	A network of laboratories that can respond to biological and chemical threats and other public health emergencies. The network consists of federal, state, and local public health; military; food testing; environmental; veterinary; and international laboratories.
Victim Information Center (VIC) Teams	HHS ASPR	Provide support to local authorities in the aftermath of a natural or man-made disaster or public health emergency by helping to identify the victims and serving as a liaison to the victims' families or other responsible parties in support of another NDMS team.

Department of Defense Assets for CBRN Incidents

Asset	Dept./Agency	Description
Planning & Response Teams (PRTs)	United States Army Corps of Engineers (USACE)	Provide ice, water, power, debris removal, temporary housing, temporary roofing, and structural safety assessments.
249th Engineer Battalion (Prime Power)	USACE	Provides operational assistance in power generation and distribution for facilities like hospitals, shelters, water and sewer facilities, and police and fire stations.

Asset	Dept./Agency	Description
Weapons of Mass Destruction Civil Support Team (WMD-CST)	State/Territory National Guards	Comprised of 22-person teams, prepared to deploy in three hours to provide rapid detection, assessment, and identification of hazardous materials. There are 57 WMD-CSTs located in each state, U.S. territory, and Washington, D.C. (with two in California, Florida, and New York).
CBRN Enhanced Response Force Package (CERFP)	State/Territory National Guards	Provides search & recovery, decontamination, and emergency medical care. Comprised of 17 units of 197 personnel each, located throughout the country and prepared to deploy in 6 hours.
Homeland Response Force (HRF)	State/Territory National Guards	Provides command & control, search & extraction, decontamination, emergency medical care, and casualty assistance. Comprised of 10 units of 577 personnel each, located throughout the country and prepared to deploy in 6–12 hours.
Defense CBRN Response Force (DCRF)	United States Army North (ARNORTH)	Provides command & control, CBRN assessment, search & rescue, decontamination, emergency medical care, medical and surgical capability, physical security, engineering, logistics, transportation, air/ground medical evacuation, and aviation lift. Deploys in two force packages (FP). FP-1 is 2,100 personnel prepared to deploy in 24 hours. FP-2 is 3,100 personnel prepared to deploy in 48 hours.
Command & Control CBRN Response Element - Alpha and Bravo (C2CRE-A and C2CRE-B)	ARNORTH	Provide command & control, CBRN assessment, search & rescue, decontamination, emergency medical care, physical security, engineering, logistics, and transportation. Comprised of two units of 1,500 personnel each prepared to deploy in 96 hours.

Other Federal Assets for CBRN Incidents

Asset	Dept./Agency	Description
Domestic Emergency Support Team (DEST)	DOJ FBI	Rapidly deployable team of interagency CBRN experts that provide decision-making, contingency planning and technical support, pre-incident consequence management, and state and local engagement.

Asset	Dept./Agency	Description
Forest Service (FS) Firefighting Assets	USDA FS	Provide response assistance through firefighting support, fire suppression and assistance planning, command and control support, emergency road clearing, logistics facility support, radio/communications system support, and cache support for mass care shelters.
National Transportation Safety Board (NTSB) Transportation Disaster Assistance Division (TDA)	NTSB TDA	Provides assistance to families of passengers involved in major aviation and passenger rail disasters.
Emergency Communications and Outreach Team (ECOT)	EPA	Comprised of community involvement and public affairs specialists who have experience in emergency and removal response that can support public outreach for extended periods of time. ECOT has the ability to set up and/or function in a Joint Information Center (JIC), work with the media, address public inquiries and community involvement issues, develop and implement communication strategies, and craft press releases and fact sheets.
Advisory Team for Environment, Food, and Health (A-Team)	EPA/USDA/HHS CDC/HHS FDA	Develops recommendations on environmental, food, health, and animal health matters.
National Veterinary Services Laboratories (NVSL)	USDA Animal and Plant Health Inspection Service (APHIS)	Safeguard U.S. animal health and contribute to public health by ensuring that timely and accurate laboratory support is provided by their nationwide animal-health diagnostic system.
National Animal Health Laboratory Network (NAHLN)	USDA APHIS	Provides animal health diagnostic testing to detect biological threats to the nation’s food animals, thus protecting animal health, public health, and the nation's food supply.
Integrated Consortium of Laboratory Networks (ICLN)	DHS Countering Weapons of Mass Destruction Office (CWMD)	Coordinates federally sponsored analytical laboratory services for CBRN incidents. Provides timely, credible, and interpretable data in support of surveillance, early detection, and effective consequence management.

Appendix F: Acronym List

ACS	Alternate Care Sites
APHIS	Animal and Plant Health Inspection Service
ASPR	Administration for Strategic Preparedness and Response (Formerly the Office of the Assistant Secretary for Preparedness and Response)
BIA	Biological Incident Annex
CBRN	Chemical, Biological, Radiological, Nuclear
CDC	Centers for Disease Control and Prevention
CDP	Center for Domestic Preparedness
CERC	Crisis and Emergency Risk Communication
CERT	Community Emergency Response Team
COCA	Clinician Outreach and Communication Activity
COG	Continuity of Government
COOP	Continuity of Operations
CONOPS	Concept of Operations
COVID-19	Coronavirus disease 2019
CPCB	Community Planning and Capacity Building
CRC	Community Reception Center
DHS	Department of Homeland Security
DMATs	Disaster Medical Assistance Teams
DMORTs	Disaster Mortuary Operational Response Teams
DoD	Department of Defense
DOI	Department of the Interior
DOJ	Department of Justice

DOS	Department of State
DPA	Defense Production Act
DTRA	Defense Threat Reduction Agency
EA	External Affairs
EDI	Emerging Disease Incident
EMAC	Emergency Management Assistance Compact
EMI	Emergency Management Institute
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
Epi-Aid	Epidemiologic Assistance
ESF	Emergency Support Function
EVD	Ebola Virus Disease
FAIA	Food and Agriculture Incident Annex
FBI	Federal Bureau of Investigation
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FIOP	Federal Interagency Operational Plan
FMS	Federal Medical Station
FNS	Food and Nutrition Service
FSLTT	Federal, state, local, tribal, territorial
GIS	Geographic Information System
HAZMAT	Hazardous Materials
HCC	Healthcare coalitions
HHS	Department of Health and Human Services

HMR	Hazardous Materials Regulation
HPAC	Hazard Prediction and Assessment Capability
HPP	Hospital Preparedness Program
IC	Incident Command
ICLN	Integrated Consortium of Laboratory Networks
ICS	Incident Command System
IHR	International Health Regulations
IMAAC	Interagency Modeling and Atmospheric Assessment Center
IMATS	Inventory Management and Tracking System
IPAWS	Integrated Public Alert and Warning System
JIC	Joint Information Center
JOC	Joint Operations Center
KPF	Key Planning Factor
LFA	Lead Federal Agency
LRN	Laboratory Response Network
LRN-B	Laboratory Response Network for Biological Threats
MCMs	Medical Countermeasures
MOA	Memorandum of Agreement
MoDI	Modeling and Data Inventory
MOU	Memorandum of Understanding
NAHEMS	National Animal Health Emergency Management System
NAHLN	National Animal Health Laboratory Network
NASAAEP	National Alliance of State Animal and Agricultural Emergency Programs
NBIC	National Biosurveillance Integration Center

NCHRP	National Cooperative Highway Research Program
NCR	Natural and Cultural Resources
NDMS	National Disaster Medical System
NDRF	National Disaster Recovery Framework
NGO	Non-Governmental Organization
NIH	National Institutes of Health
NMRT	National Medical Response Team
NORS	National Outbreak Reporting System
NPIs	Non-Pharmaceutical Interventions
NRF	National Response Framework
NRS	National Response System
NSC	National Security Council
NVRT	National Veterinary Response Team
NVSL	National Veterinary Services Laboratories
NWSS	National Wastewater Surveillance System
OSC	On-Scene Coordinators
PAHPAIA	Pandemic and All-Hazards Preparedness and Advancing Innovation Act
PEP	Post-Exposure Prophylaxis
PETS	Pets Evacuation and Transportation Standards
PHEF	Public Health Emergency Fund
PHEIC	Public Health Emergency of International Concern
PHEP	Public Health Emergency Preparedness
PHSA	Public Health Services Act
PIO	Public Information Officer

POD	Point of Dispensing
PPD	Presidential Policy Directive
PPE	Personal Protective Equipment
PrEP	Pre-Exposure Prophylaxis
PREP Act	Public Health Readiness and Emergency Preparedness Act
RedDOG	Readiness and Deployment Operations Group
RSF	Recovery Support Function
SARS	Severe Acute Respiratory Syndrome
SAMHSA	Substance Abuse and Mental Health Administration
SBA	Small Business Administration
SLTT	State, local, tribal, territorial
SME	Subject matter expert
SNS	Strategic National Stockpile
SRO	Senior Response Official
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
TRACIE	Technical Resources, Assistance Center, and Information Exchange
TRB	Transportation Research Board
UCG	Unified Coordination Group
U.S.	United States
USACE	United States Army Corps of Engineers
USDA	U.S. Department of Agriculture
USPS	U.S. Postal Service
USSR	Union of Soviet Socialist Republics
VIC	Victim Information Center

VOAD	Voluntary Organizations Active in Disasters
VS	Veterinary Services
WEA	Wireless Emergency Alert
WHO	World Health Organization
WNV	West Nile Virus

Appendix G: Glossary of Terms

Active Surveillance: Involves health departments proactively contacting healthcare providers or laboratories requesting information about diseases.

Aerosol: Fine liquid or solid particles suspended in a gas.

Ambulatory: Persons able to understand directions, talk, and walk unassisted.

Antimicrobial: A substance, such as an antibiotic, that kills or stops the growth of microbes, including bacteria, fungi, or viruses.

Asymptomatic: Producing or showing no symptoms of a disease.

Bacteria: Microscopic living organisms, usually one-celled organisms.

Biological Incident: Occurrence of cases or outbreaks involving a biological pathogen that affects people, regardless of whether it is naturally occurring or deliberately caused.

BioWatch: System designed to detect the presence of airborne biological agents.

Category A Biologic Agent: Organisms/biological agents that pose the highest risk to national security and public health because they (1) can be easily disseminated or transmitted from person to person, (2) result in high mortality rates and have the potential for major public health impact, (3) might cause public panic and social disruption, and (4) require special action for public health preparedness.

Category B Biologic Agent: Second highest priority organisms/biological agents that (1) are moderately easy to disseminate, (2) result in moderate morbidity rates and low mortality rates, and (3) require specific enhancements for diagnostic capacity and enhanced disease surveillance.

Category C Biologic Agent: Third highest priority and include emerging pathogens that could be engineered for mass dissemination in the future because of (1) availability, (2) ease of production and dissemination, and (3) potential for high morbidity and mortality rates and major health impact.

Causative Agent: Biological pathogen that causes a disease such as a virus, parasite, fungus, or bacterium.

Community NPIs: Strategies and policies that communities and organizations can implement to help slow the spread of illness during an infectious disease outbreak (e.g., social distancing and temporary closing of centers).

Community Reception Centers (CRCs): Local, temporary response strategy for conducting population monitoring in response to an emergency with administrative and allied healthcare assistants and volunteers responsible for emergency care delivery to “all hazards” survivors.

Contact Tracing: Identification and diagnosis of people who may have come into contact with an infected person.

Contagious Disease: Infectious disease that is spread from one person to another. Capable of being transmitted by bodily contact with an infected person. Only some infectious diseases are contagious.

Contaminated: Presence of an infectious agent on a body surface, the environment, also on or in clothes, bedding, toys, surgical instruments or dressings, or other inanimate articles or substances including water, milk, and other food.

Continuity of Government (COG): Coordinated effort within each of the executive, legislative, and judicial branches to ensure that governance and essential functions continue to be performed before, during, and after an emergency.

Continuity of Operations (COOP): Ensures an individual organization can continue to perform its essential functions, provide essential services, and deliver core capabilities during a disruption to routine operations.

Critical Infrastructure: Systems and assets, whether physical or virtual, so vital that the incapacity or destruction of such may have a debilitating impact on the security, economy, public health or safety, environment, or any combination of those matters, across any federal, state, tribal, territorial, or local jurisdiction.

Decontamination: Process of reducing or removing a hazard from the environment, property, or life form through physical removal or neutralization.

Detection: Clinical or laboratory discovery of a biological pathogen.

Disability: Physical or mental impairment that substantially limits one or more major life activity.

Disease: Sickness, illness, or loss of health.

Disease Surveillance: Epidemiological practice to monitor the spread of disease in people and/or animals in order to establish patterns of progression.

Emergency Declaration: Declared by the President to supplement state and local or Indian tribal government efforts in providing emergency services, such as the protection of lives, property, public health, and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

Emergency Support Functions (ESFs): Structure for coordinating federal interagency support for response to an incident. Grouping of functions that provide federal support to states and federal-to-federal support, both for Stafford Act declared disasters and emergencies and for non-Stafford Act incidents.

Emergency Use Authorization: Mechanism to facilitate the availability and use of MCMs, including vaccines, during public health emergencies.

Endemic: Regularly found among a certain population or in a certain area.

Engineering Controls: Protect workers by removing hazardous conditions or by placing barriers between the worker and the hazard.

Environmental NPIs: Establishment of barriers or specialized equipment to protect persons from biological hazards. These also include routine surface cleaning that helps to eliminate pathogens from frequently touched surfaces and objects in homes, childcare facilities, schools, workplaces, and other settings where people regularly gather.

Environmental Persistence: Length of time a contaminant remains in the environment.

Epi-Aid: Mechanism for public health authorities to request short-term epidemiologic assistance from HHS CDC to respond to an urgent public health problem.

Epidemiological Investigation: Investigation of an urgent public health problem such as infectious disease outbreaks, unexplained illnesses, or natural or man-made disasters.

Epidemiologist: Investigator who studies the occurrence of disease or other health-related conditions, states, or events in specified populations; one who practices epidemiology; the control of disease is advised by the epidemiologist based on his/her investigation.

Exposed: Unprotected contact to an infectious agent, which may or may not develop disease.

Exposure: Contact with infectious agents (bacteria or viruses) in a manner that promotes transmission and increases the likelihood of disease.

Fatality Management: Coordination of several organizations (e.g., law enforcement, healthcare, emergency management, medical examiner, etc.) to ensure the proper recovery, handling, identification, transportation, tracking, storage, and disposal of human remains.

Hazardous Waste: Waste with properties that make it dangerous or capable of having a harmful effect on human health, animals, plants, or the environment.

Healthcare Coalitions (HCCs): Group of individual healthcare and response organizations (e.g., hospitals, EMS, emergency management organizations, and public health agencies) in a defined geographic location that play a critical role in developing healthcare system preparedness and response capabilities.

Household Pet: A domesticated animal, such as a dog, cat, bird, rabbit, rodent, or turtle, that is traditionally kept in the home for pleasure rather than for commercial purposes, can travel in commercial carriers, and can be housed in temporary facilities. Household pets do not include reptiles (except turtles), amphibians, fish, insects/arachnids, farm animals (including horses), and animals kept for racing purposes.

Immunocompromised: Having an impaired immune system.

Incubation Period: Time between exposure to an infectious agent and the appearance of the first symptoms.

Infectious Agents: Organisms capable of spreading disease (e.g., bacteria or viruses).

Infectious Disease: Illness caused by a microorganism (e.g., bacteria, viruses, fungi) that enters the body, multiplies, and can cause an infection. Infectious diseases may be transmitted by contact with infected individuals or their bodily fluids (such as respiratory droplets, blood, or semen), by contact with contaminated surfaces or objects (fomites), by ingestion of contaminated water, or by direct or indirect contact with disease vectors (e.g., mosquitoes, fleas, mice). Infectious diseases may also be referred to as communicable or transmissible diseases.

Isolation: Physical separation of individuals with a contagious infectious illness from healthy individuals who have not been exposed to the biological agent. Isolation can be implemented at home or in a separate room in a healthcare setting depending on the specific nature of the biological incident.

Medical Countermeasures (MCMs): Regulated pharmaceutical products and interventions (e.g., prophylaxes, therapeutics, diagnostic tests, personal protective equipment) used to prevent, mitigate, or treat adverse health effects of chemical, biological, radiological, or nuclear incidents.

Method of Dissemination: Process by which an agent is released into the environment, such as by contamination of food, water, objects, surfaces, infected vectors, aerosol-generation devices, etc.

Mode of Transmission: Infectious agent transfer, through direct or indirect contact, from a natural source to a susceptible host.

Model: Physical, conceptual, or mathematical approximation of a real phenomenon.

Morbidity: Incidence of disease in a population and/or a geographic location.

Mortality: Incidence of death or the number of deaths in a population.

National Biosurveillance Integration Center (NBIC): An entity within DHS, NBIC serves as the designated government entity to synthesize and analyze information collected from across the spectrum of biosurveillance organizations.

Natural Attenuation: Natural processes to clean up or reduce the effect of pollution in soil and groundwater.

Non-Pharmaceutical Interventions (NPIs): Items such as ventilators and devices; personal protective equipment such as face masks and gloves; and public health interventions (e.g., contact and transmission interventions, social distancing, and community shielding) to prevent and mitigate the health effects of biological agents, some of which may be HHS FDA-regulated and some of which are not.

Outbreak: Increase in a disease in a certain geographic area, over a certain period of time, above an expected baseline. (An expected baseline may be one case for smallpox, for example, but for other diseases there may be some other baseline level that needs to be exceeded to be considered an outbreak).

Pandemic: Epidemic that has spread to human populations across a large geographic area.

Pathogens: Organisms (e.g., bacteria, viruses, parasites, and fungi) that cause disease.

Personal NPIs: Protective actions that can help individuals avoid exposure to pathogens and limit the further spread of pathogens in the environment.

Personal Protective Equipment (PPE): Used to minimize exposure to a pathogen and generally refers to clothing (e.g., goggles, shoes, gloves, etc.) and respiratory equipment (e.g., masks, self-contained breathing apparatuses).

Points of Dispensing (PODs): Community locations in which state and local agencies dispense MCMs to the public during a public health emergency.

Post-Exposure Prophylaxis (PEP): Vaccines and antibiotics given to exposed (or potentially exposed) individuals to inhibit the development of disease.

Post-Traumatic Stress Disorder (PTSD): Mental health condition triggered by either experiencing or witnessing a traumatizing event.

Presidential Policy Directive (PPD): Used to issue Presidential decisions on national security matters.

Prophylaxis: Actions and/or measures taken to prevent disease.

Public Health Emergency: Incident, either natural or man-made, that creates a health risk to the public.

Quarantine: Segregation of individuals, families, groups, and communities that have been exposed to a contagious disease but are not ill. These individuals are physically separated, and their movement restricted within defined geographic areas. Quarantine may be done at home or in a restricted area depending on the specific nature of the biological incident.

Reachback: Products, services, equipment, material, or human resources including subject matter experts from organizations that are not forward deployed.

Recovery Support Functions (RSFs): Comprise the coordinating structure for key functional areas of assistance in the National Disaster Recovery Framework (NDRF). Support local governments by facilitating problem solving, improving access to resources, and fostering coordination among state and federal agencies, non-governmental partners, and stakeholders.

Reservoirs: Habitat where an infectious agent normally lives, grows, and multiplies including humans, animals, or the environment.

Service Animal: Any guide dog, signal dog, or other animal individually trained to provide assistance to an individual with a disability including, but not limited to, guiding individuals with impaired vision, alerting individuals with impaired hearing to intruders or sounds, providing minimal protection or rescue work, pulling a wheelchair, or fetching dropped items.

Simulation: Imitation of characteristics, processes, or systems over time using another system.

Social Distancing: Actions taken by public health officials to stop or slow down the spread of a highly contagious disease (e.g., closing schools).

Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) Declaration: Invoked by the President of the United States in response to an incident either as requested by the states and/or by a federal agency requesting federal-to-federal assistance.

Strategic National Stockpile (SNS): Managed by HHS ASPR; composed of pharmaceuticals (e.g., medications, antibiotics, and IVs) and medical supplies (e.g., equipment, surgical items, etc.) that may be required to control and/or respond to a public health emergency.

Supply Chain: Steps taken to get a product or service to the end user.

Syndromic Surveillance: Tracking of disease indicators that occur before clinical diagnosis confirmation, such as chief complaint data from urgent medical visits, over-the-counter medication purchases, school absenteeism rates, and keyword (e.g., “fever,” “vomit”) presence on social media platforms.

Symptomatic: Showing symptoms or signs of a disease or injury.

Therapeutics: Remedies for disease including treatments, therapies, and/or drugs.

Vaccine: Killed or weakened microorganism products used to artificially induce immunity against a disease.

Vector/Vector-Borne Diseases: Infections transmitted by the bite of infected arthropod species, such as mosquitoes, ticks, sandflies, and blackflies.

Virulence: Severity or harmfulness of a disease.

Virus: Microscopic organism that multiplies within cells and causes disease such as chickenpox, measles, mumps, and rubella. Viruses are not affected by antibiotics, the drugs used to kill bacteria.

Zoonotic Diseases: Infectious diseases caused by germs that spread between animals and people. Also known as zoonosis (singular) and zoonoses (plural).